A330
TECHNICAL TRAINING MANUAL
MECHANICAL & AVIONICS COURSE - T1+T2 (LVL 2&3)
(RR Trent 700)
WATER/WASTE

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WATER/WASTE

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WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SYSTEM OVERVIEW

POTABLE WATER SYSTEM

Potable water is stored in two water tanks and a third one optionally. The water system supplies galleys and lavatories. The water system is pressurized by the bleed system, a dedicated compressor or a ground air pressure connection. Filling and draining are achieved from the potable water service panel and the AFT drain panel. Draining is also possible from the FWD drain panel.
The water quantity in the tanks is indicated on the Flight Attendant Panel (FAP) and optionally on the potable water service panel.

NOTE: During the servicing, the potable water system will be automatically depressurized.

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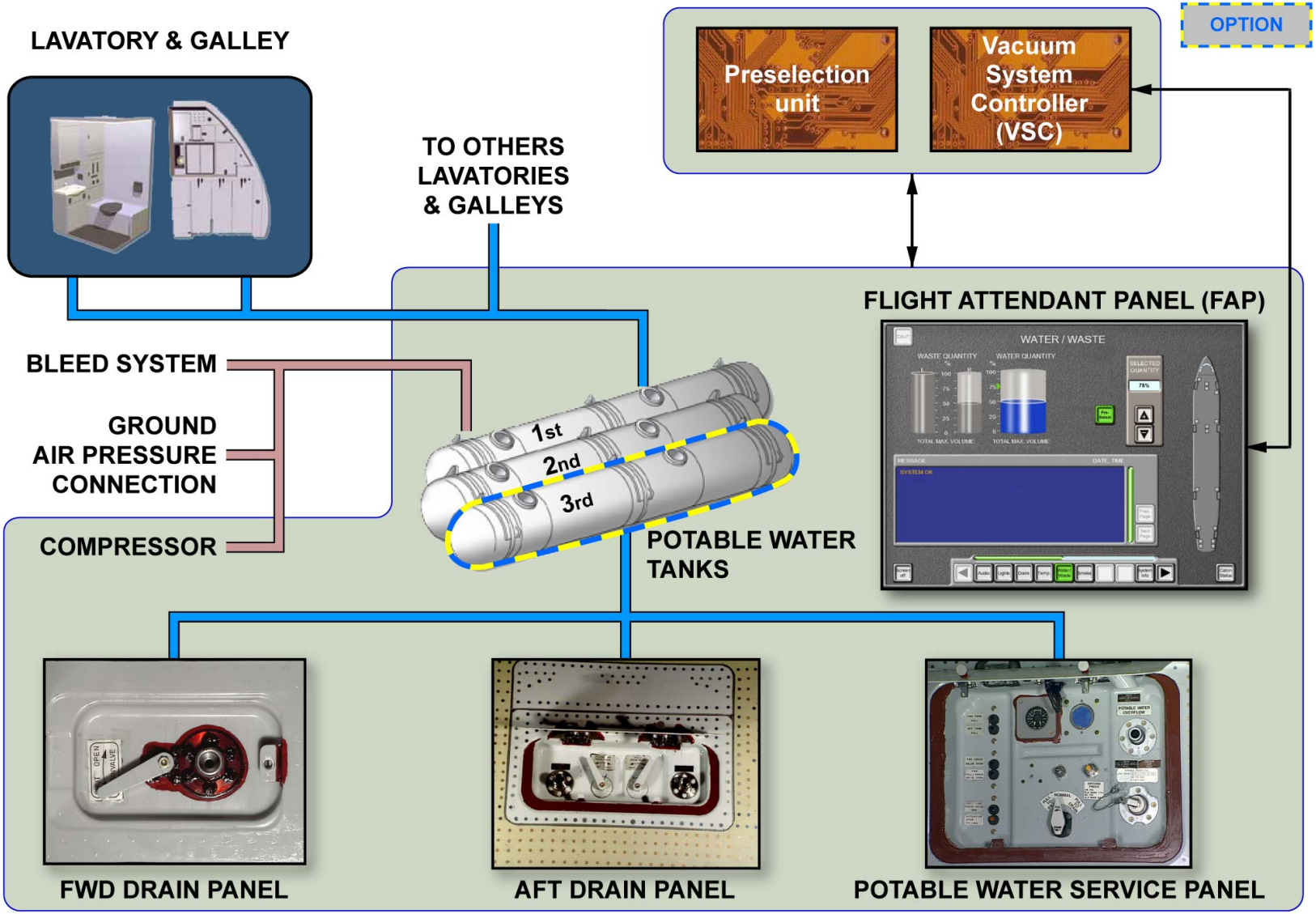

SYSTEM OVERVIEW - POTABLE WATER SYSTEM

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WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SYSTEM OVERVIEW (continued)

VACUUM TOILET SYSTEM

The toilet waste system is divided into two independent parts (LH and RH sides). Two waste tanks are installed, the third one is optional.
When a toilet is flushed, waste from the toilet assembly is sent to the waste tanks under the effect of differential pressure. When this differential pressure is not sufficient, a vacuum generator creates the necessary vacuum.
The waste tanks are drained from the waste service panel.
The Vacuum System Controller (VSC) controls and monitors the toilet system.
The waste level is indicated on the FAP.
The wastewater from the lavatory washbasins and galley sinks is drained overboard via heated drain masts.

NOTE: Note: Those parts of the drain and flush lines as well as valves and connections are heated.

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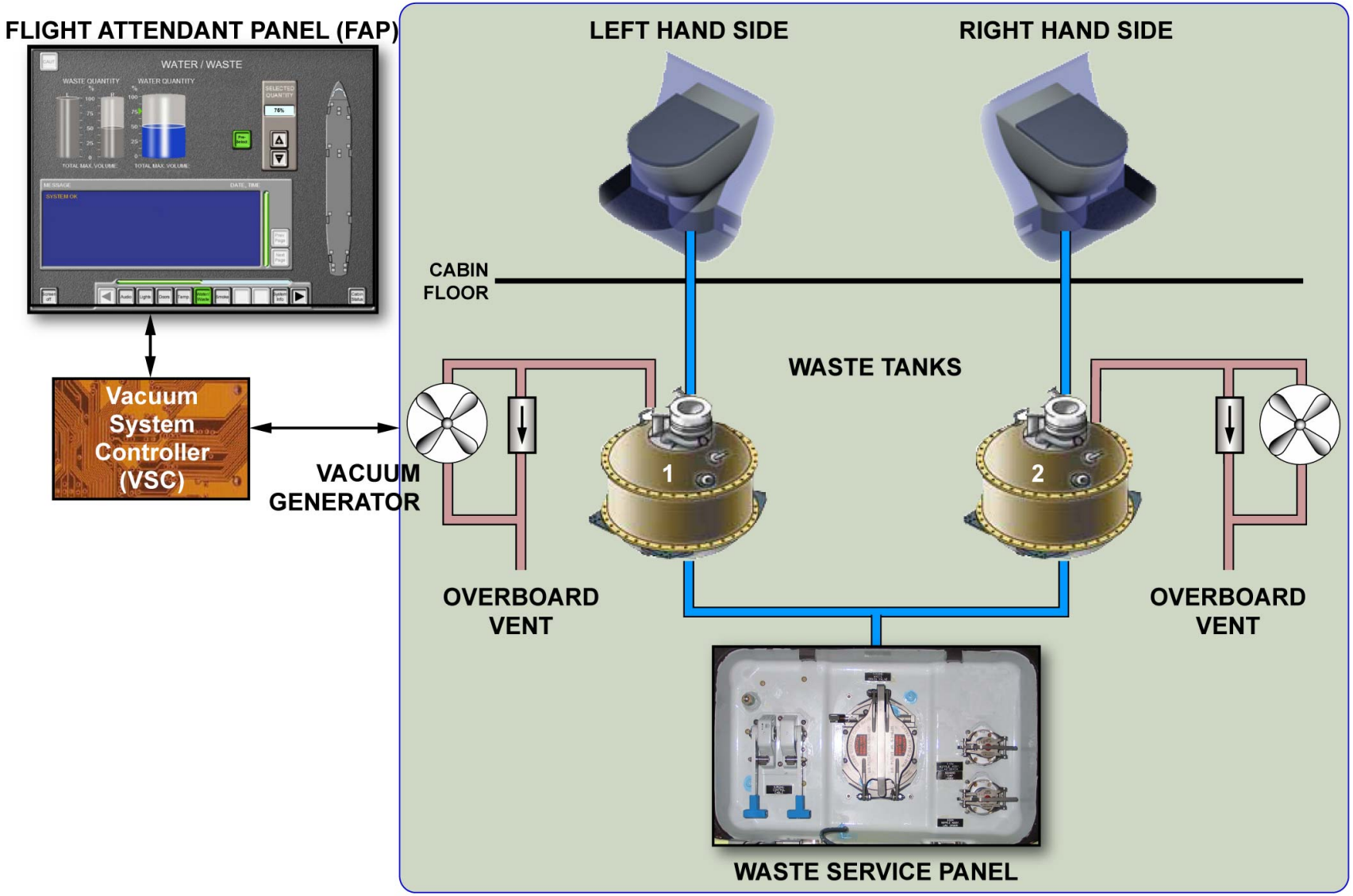

SYSTEM OVERVIEW - VACUUM TOILET SYSTEM

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WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SERVICING

POTABLE WATER SYSTEM SERVICING GENERAL

The A/C Potable Water System (PWS) can be serviced with or without electrical power. Before starting the filling procedure you must refer to the cold weather maintenance practice and if necessary do a pre-conditioning procedure.

WARNING: MAKE SURE THAT THE EQUIPMENT USED FOR THIS PROCEDURE IS CLEAN AND ADAPTED TO THE PWS. IF NOT, IT CAN CONTAMINATE THE PWS.

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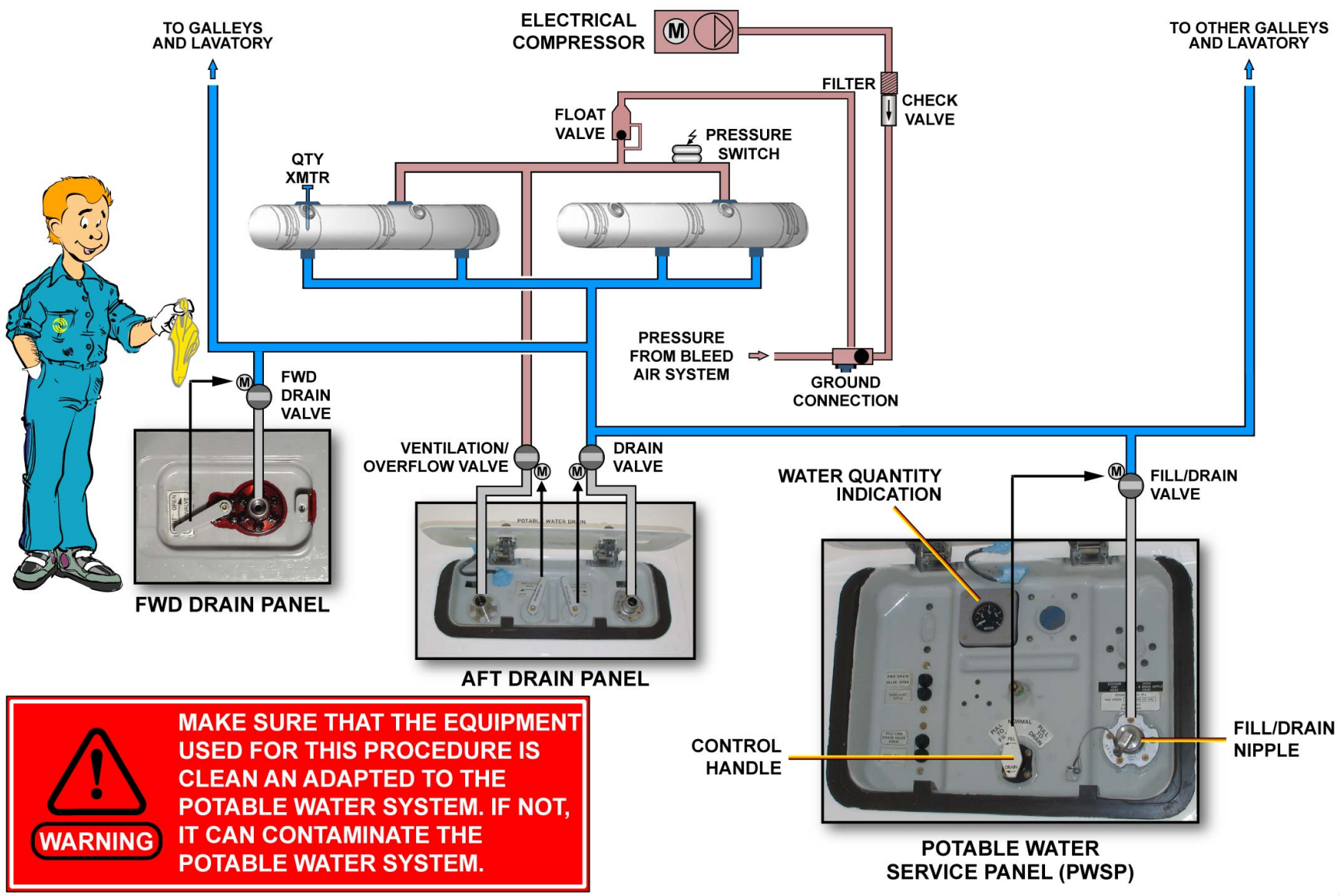

SERVICING - POTABLE WATER SYSTEM SERVICING GENERAL

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WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

POTABLE WATER SYSTEM FILLING PROCEDURE (WITH ELECTRICAL POWER)

Filling with electrical power is done through:
- the FAP,
- the PWSP.

Before opening the service panel, the required quantity is pre-selected on the FAP (25%, 50%, 75% or 100%), using the Pre-Select P/B.

WARNING: DO NOT DO WORK ON THE TOILET WASTE SYSTEM AND THE POTABLE WATER SYSTEM AT THE SAME TIME. THIS WILL PREVENT CONTAMINATION OF THE POTABLE WATER SYSTEM. SUCH CONTAMINATION CAN BE DANGEROUS TO THE HEALTH.
BEFORE YOU DO WORK ON THE POTABLE WATER SYSTEM, CLEAN YOUR HANDS WITH SOAP AND WATER. THIS WILL PREVENT INFECTION (CONTAMINATION FROM TOILET WASTE IS DANGEROUS TO THE HEALTH).
MAKE SURE THAT THE EQUIPMENT YOU USE FOR THIS PROCEDURE IS CLEAN AND APPROVED FOR THE POTABLE WATER SYSTEM. IF NOT IT CAN CAUSE CONTAMINATION OF THE POTABLE WATER SYSTEM.

Connect the fill line to the fill/drain port on the service panel. Water filling is selected on the service panel using a control handle. During filling, the pressure must not exceed 125 psi.
When the pre-selected quantity is reached, the handle will be automatically reset. The procedure can be stopped at any time through manual operation of the control handle.

NOTE: The Potable Water Service Panel has control lights, which indicate the valves position, failures and refilling completed. This service panel is different if 3 tanks are installed.

Cross-check the water level indication on both the quantity indicator and the FAP. Make sure that this indication complies with the pre-selected quantity value. Disconnect the servicing cart hose from the fill/drain nipple. Clean, dry and close the service panel.

NOTE: To reduce the possibility of microbiological organism multiplication in the potable water, disinfection of the potable water system must be done at appropriate interval according to national requirements or MPD (every 2.800 FH).

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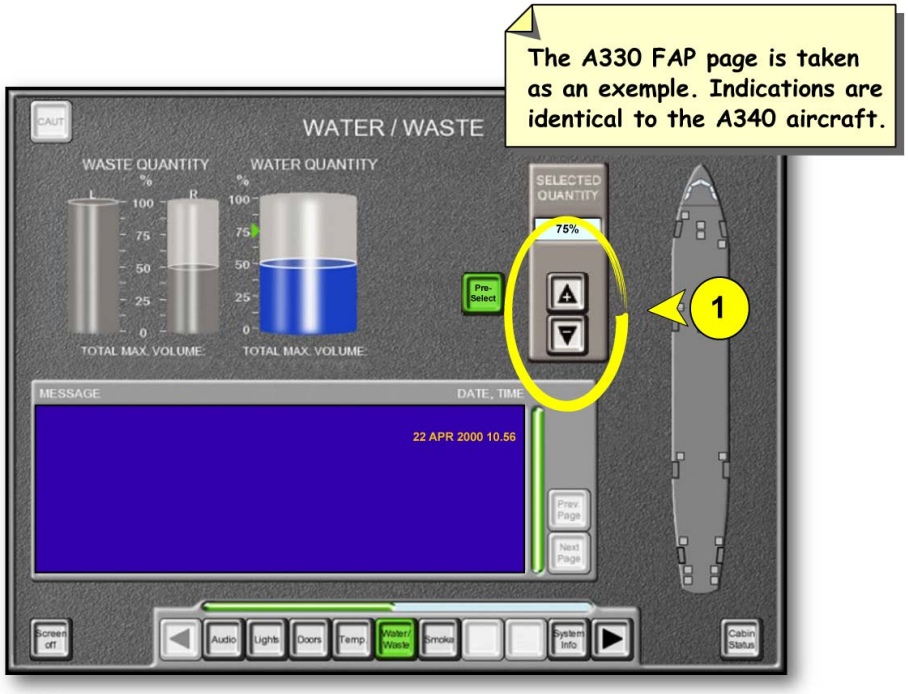
1 Select "Pre-Select" level on the FAP.
NOTE: Preselection must be done before opening the service panel door.



FAP

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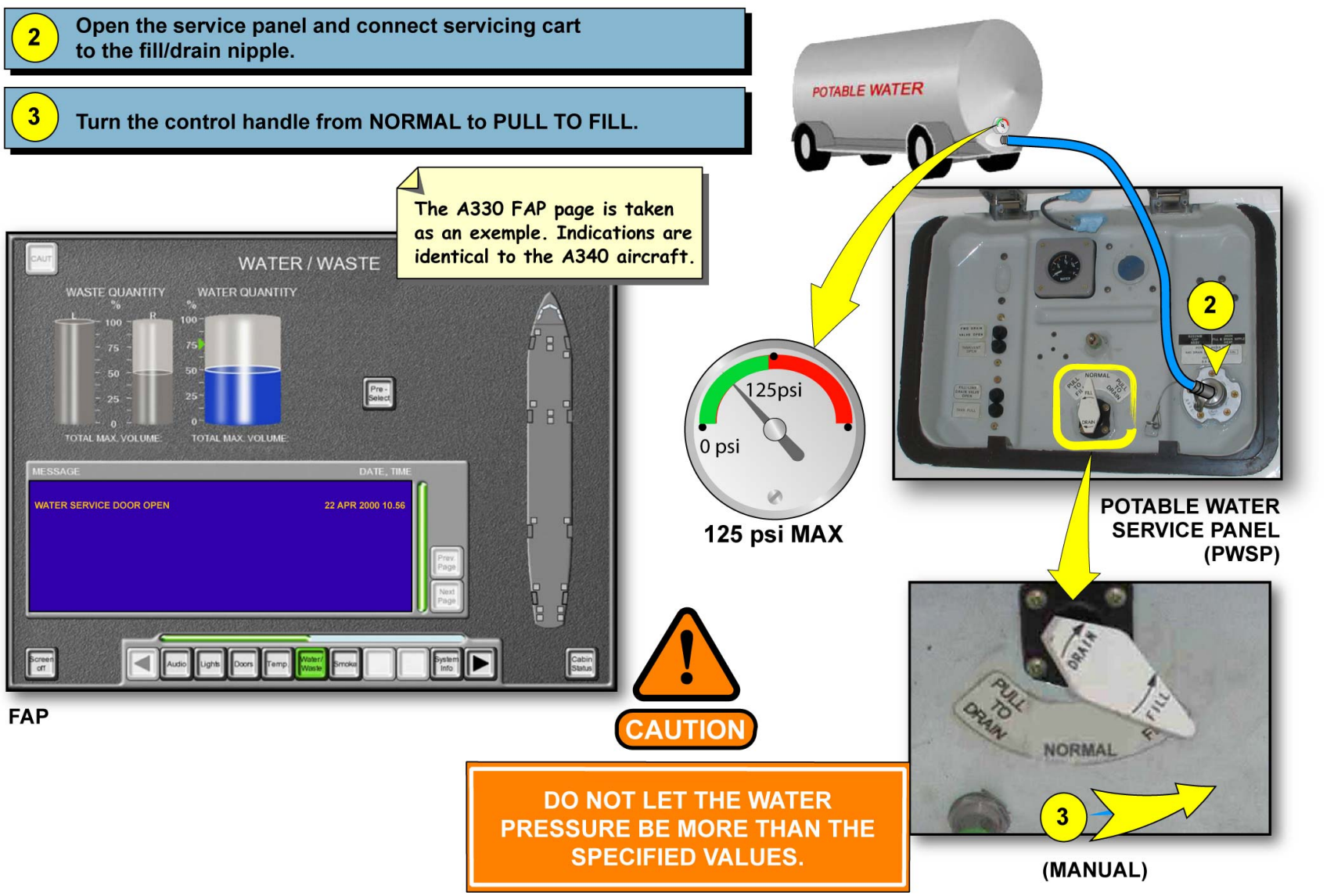
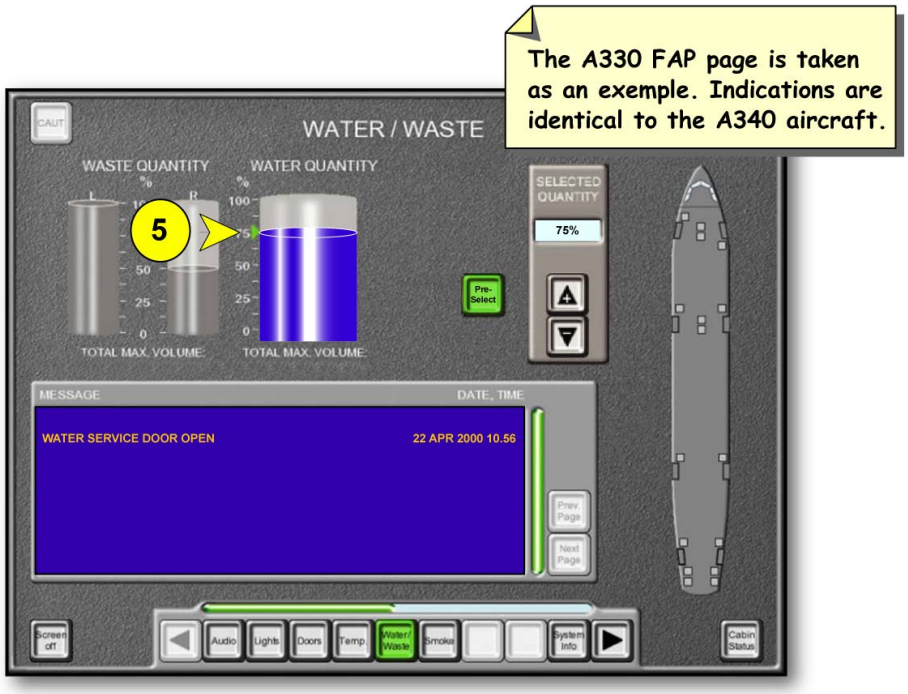


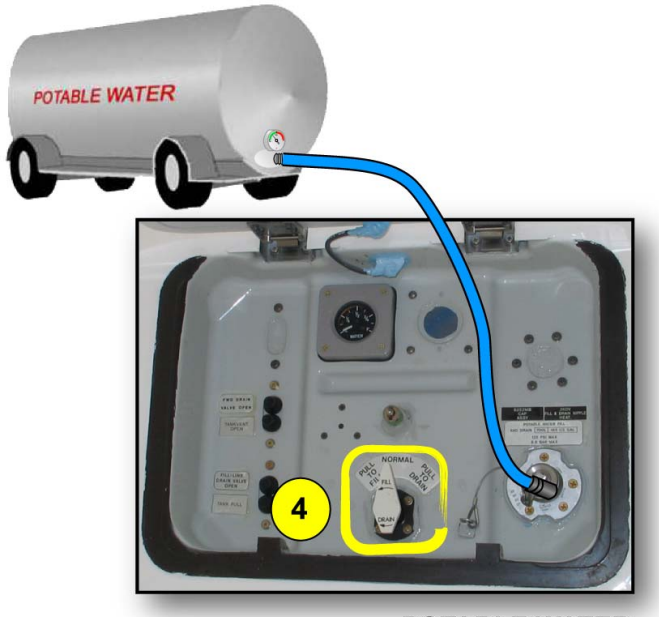
SERVICING - POTABLE WATER SYSTEM FILLING PROCEDURE (WITH ELECTRICAL POWER)

4 Confirm when the set value is reached, the control handle goes automatically back to the NORMAL position.

5 Make sure that the actual quantity indication on the FAP is the same as the set quantity indication.



FAP



POTABLE WATER SERVICE PANEL (PWSP)

QUANTITY INDICATOR

SERVICING - POTABLE WATER SYSTEM FILLING PROCEDURE (WITH ELECTRICAL POWER)

WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

POTABLE WATER SYSTEM FILLING PROCEDURE (WITHOUT ELECTRICAL POWER)

When filling without electrical power, apply the same precautions and cleanliness procedures as described during filling with electrical power. Open the doors of the PWSP and the AFT drain panel. Connect the fill hose of the water service vehicle to the fill/ drain port. Connect hoses to the ventilation/overflow ports on the AFT drain panel and put containers in position.

On the AFT drain panel, turn the ventilation/overflow drain valve handle to the OPEN position, then the ventilation/overflow valve opens.

On the PWSP, turn the fill/drain valve control handle to the PULL TO FILL position and pull it out to the mechanical stop, then the fill/drain valve opens. Operate the water service vehicle at a pressure of 125 psi to fill the tanks. When the water flows from the ventilation/overflow port on the AFT drain panel, the tanks are full. Turn the the ventilation/overflow ports on the AFT drain panel to the SHUT position then put the fill/drain valve handle to the CLOSE position.

Switch off the water supply and disconnect the hoses. Put a cap on the fill/drain port on the PWSP. Clean and dry the panels and make sure that no leaks are visible. Close the service panel doors. Remove all equipment and ground support.

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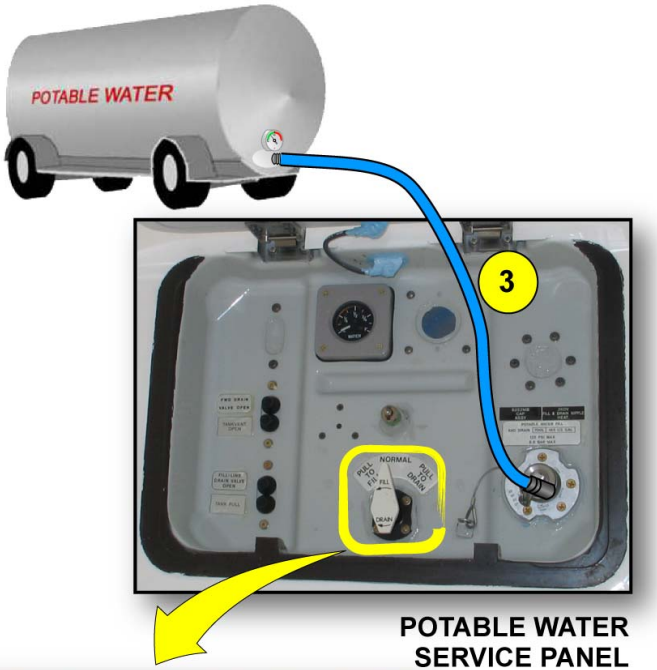
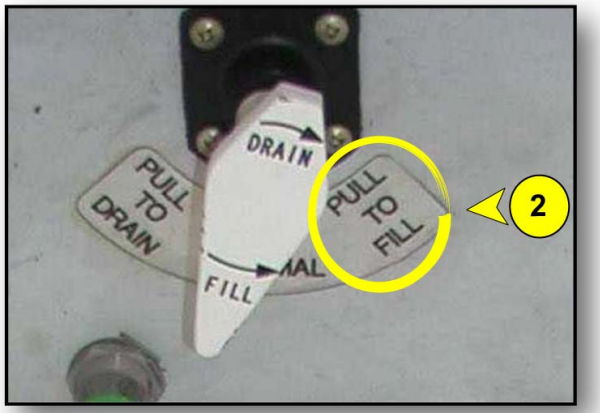
1. On the AFT drain panel, turn the VENTILATION/OVERFLOW valve to the OPEN position.
2. On the PWSP, turn the FILL/DRAIN valve control handle to PULL TO FILL position and pull it out to the mechanical stop.
3. Operate the water service vehicle at a pressure of 125 psi to fill the tanks.
4. When the water flows from the overflow port on the AFT drain panel, the tanks are full. Turn the VENTILATION/OVERFLOW valve handle to the CLOSE position, and the FILL/DRAIN valve control to the NORMAL position on the PWSP.



POTABLE WATER SERVICE PANEL (PWSP)

AFT DRAIN PANEL



SERVICING - POTABLE WATER SYSTEM FILLING PROCEDURE (WITHOUT ELECTRICAL POWER)

WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

POTABLE WATER SYSTEM DRAINING PROCEDURE (WITH ELECTRICAL POWER)

To collect the water, put a container below each drain port or connect drain hoses:
- on the PWSP to the fill/drain nipple,
- on the AFT drain panel to the drain nipple (if only two potable water tanks are installed),
- on the FWD potable water drain panel to the drain nipple.

On the PWSP, when the fill/drain valve control handle is turned from the NORMAL to the DRAIN position, the fill/drain valve open. On the AFT drain panel the ventilation/overflow valve and the drain valve open electrically, as well as the FWD drain valve on the FWD drain panel. Then, "FILL-LINE DRAIN VALVE OPEN", the "FWD DRAIN VALVE OPEN" and the "TANK VENT OPEN" control lights come on.

Water drains from the AFT drain port on the AFT drain panel and from the drain port on the FWD drain panel.

When draining is complete, the fill/drain control handle must be placed back in the NORMAL position. The FWD drain valve, the AFT drain valve and the fill/drain valve close. The ventilation/overflow valve also closes automatically. The "FILL-LINE DRAIN VALVE OPEN", the "FWD DRAIN VALVE OPEN" and the "TANK VENT OPEN" control lights go off.

Remove the draining equipment on the FWD drain panel and AFT drain panel, then close up the access doors.

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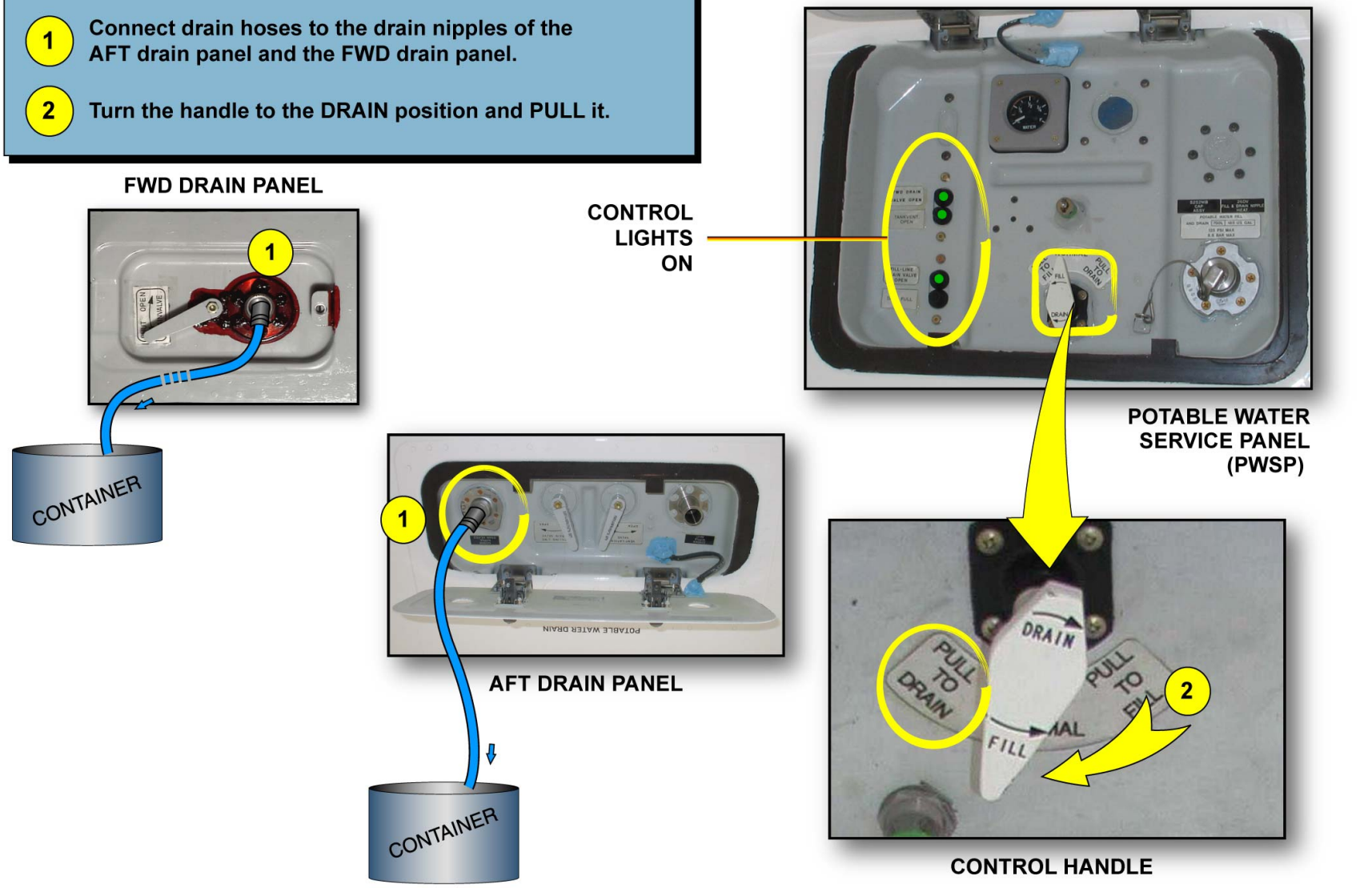
1 Connect drain hoses to the drain nipples of the AFT drain panel and the FWD drain panel.

2 Turn the handle to the DRAIN position and PULL it.



SERVICING - POTABLE WATER SYSTEM DRAINING PROCEDURE (WITH ELECTRICAL POWER)

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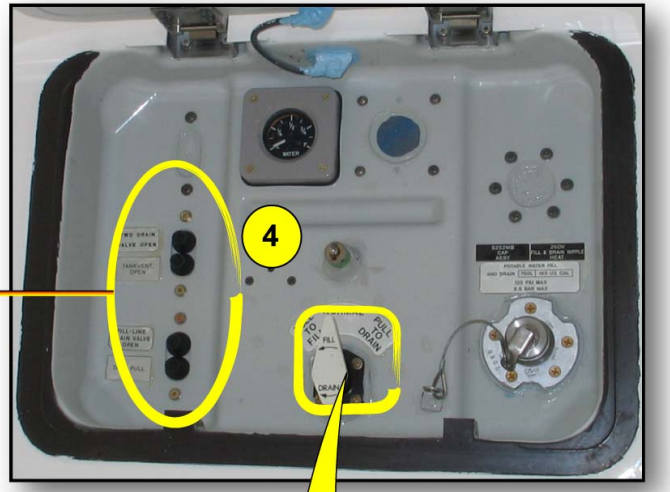
3 Place back the control handle to the NORMAL position.

4 On the PWSP, the valve control lights go off.

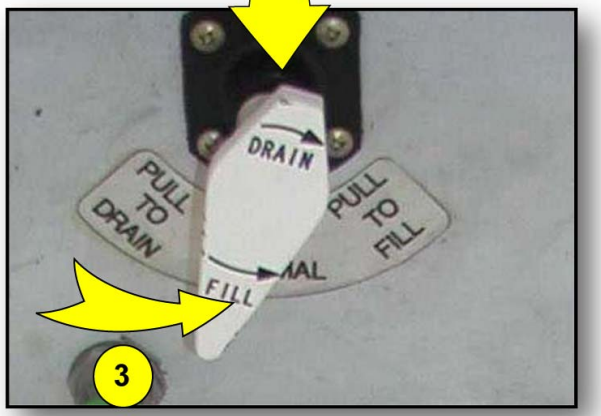
FWD DRAIN PANEL

CONTROL LIGHTS OFF



POTABLE WATER SERVICE PANEL (PWSP)

AFT DRAIN PANEL



CONTROL HANDLE

SERVICING - POTABLE WATER SYSTEM DRAINING PROCEDURE (WITH ELECTRICAL POWER)

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5 Close-up

TASK COMPLETED

SERVICING - POTABLE WATER SYSTEM DRAINING PROCEDURE (WITH ELECTRICAL POWER)

WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

POTABLE WATER SYSTEM DRAINING PROCEDURE (WITHOUT ELECTRICAL POWER)

To collect the water, put a container below each drain port or connect drain hoses. The fill/drain valve control handle is manually set from the NORMAL to the DRAIN position. Pull it out to the mechanical stop to open the fill/drain valve. Afterwards, on the AFT drain panel, the ventilation/overflow valve and the drain valve are set to the OPEN position using the control handles. Water drains from the drain port of the AFT drain panel.

Finally, the FWD drain valve is opened manually using the control handle on the FWD drain panel. Water drains from the drain port on the FWD drain panel. On the PWSP, no indication is given on the valves position.

When draining is complete, all drain valves set to the SHUT position then the control lever of the fill/drain valve must be manually turned to the NORMAL position.

If a third tank is installed, the draining procedure is identical but the PWSP also has a ventilation/overflow SOV, which is set to OPEN position to vent the third tank. With three potable water tanks, two additional FWD and AFT tank SOV are used to drain the potable water system.

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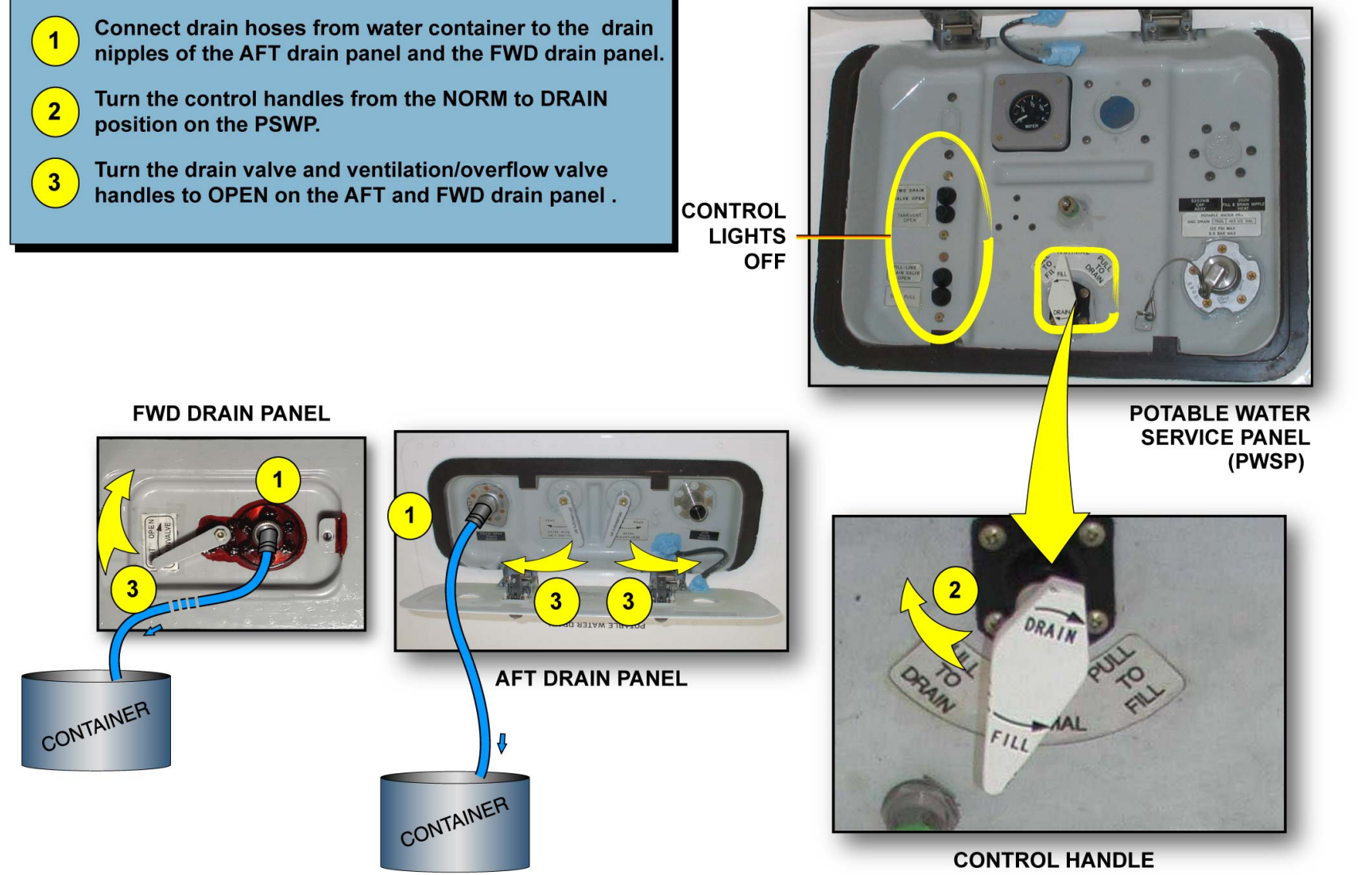
1. Connect drain hoses from water container to the drain nipples of the AFT drain panel and the FWD drain panel.
2. Turn the control handles from the NORM to DRAIN position on the PSWP.
3. Turn the drain valve and ventilation/overflow valve handles to OPEN on the AFT and FWD drain panel .



SERVICING - POTABLE WATER SYSTEM DRAINING PROCEDURE (WITHOUT ELECTRICAL POWER)

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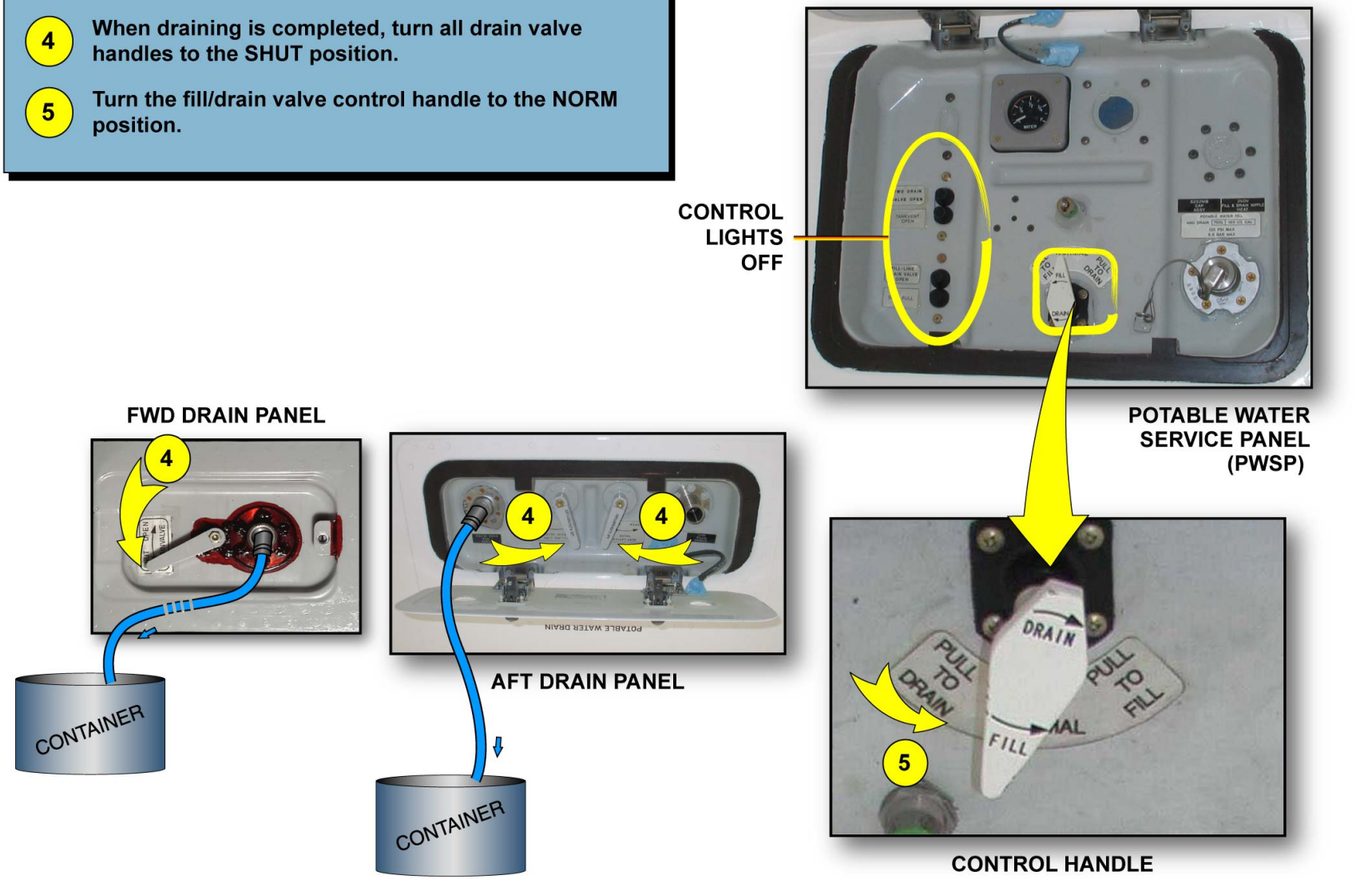
4 When draining is completed, turn all drain valve handles to the SHUT position.

5 Turn the fill/drain valve control handle to the NORM position.



SERVICING - POTABLE WATER SYSTEM DRAINING PROCEDURE (WITHOUT ELECTRICAL POWER)

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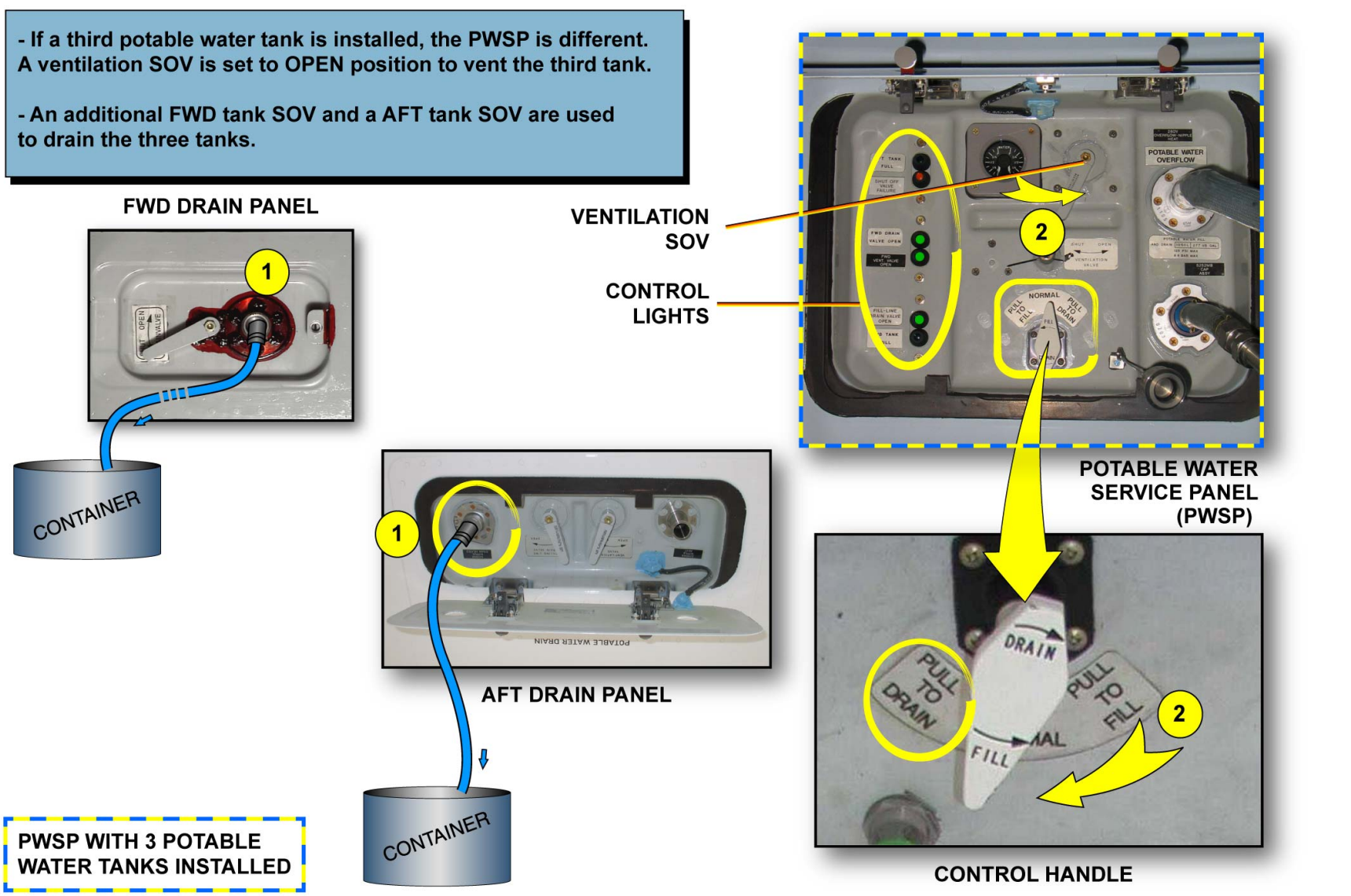
- If a third potable water tank is installed, the PWSP is different. A ventilation SOV is set to OPEN position to vent the third tank.
- An additional FWD tank SOV and a AFT tank SOV are used to drain the three tanks.
FWD DRAIN PANEL
1
CONTAINER
VENTILATION SOV
CONTROL LIGHTS
2
POTABLE WATER SERVICE PANEL (PWSP)
1
AFT DRAIN PANEL
CONTAINER
DRAIN
PULL TO DRAIN
PULL TO FILL
FILL
2
CONTROL HANDLE
PWSP WITH 3 POTABLE WATER TANKS INSTALLED

SERVICING - POTABLE WATER SYSTEM DRAINING PROCEDURE (WITHOUT ELECTRICAL POWER)

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WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

TOILET WASTE TANK SERVICING GENERAL

Servicing the A/C waste system is accomplished by draining, flushing and disinfecting. The whole procedure is done through the waste service panel.

WARNING: ALWAYS USE RUBBER GLOVES WHEN YOU DO WORK:
- ON THE TOILET WASTE SYSTEM, OR,
- ON PARTS THAT HAVE CONTAMINATION FROM THE WASTE SYSTEM.

WHEN YOU COMPLETE THE WORK PROCEDURE, CLEAN YOUR HANDS WITH SOAP AND WATER. THIS WILL PREVENT INFECTION (TOILET WASTE IS DANGEROUS FOR THE HEALTH).

DO NOT DO WORK ON THE TOILET WASTE SYSTEM AND THE POTABLE WATER SYSTEM AT THE SAME TIME. THIS WILL PREVENT CONTAMINATION OF THE POTABLE WATER SYSTEM. SUCH CONTAMINATION CAN BE DANGEROUS TO THE HEALTH.

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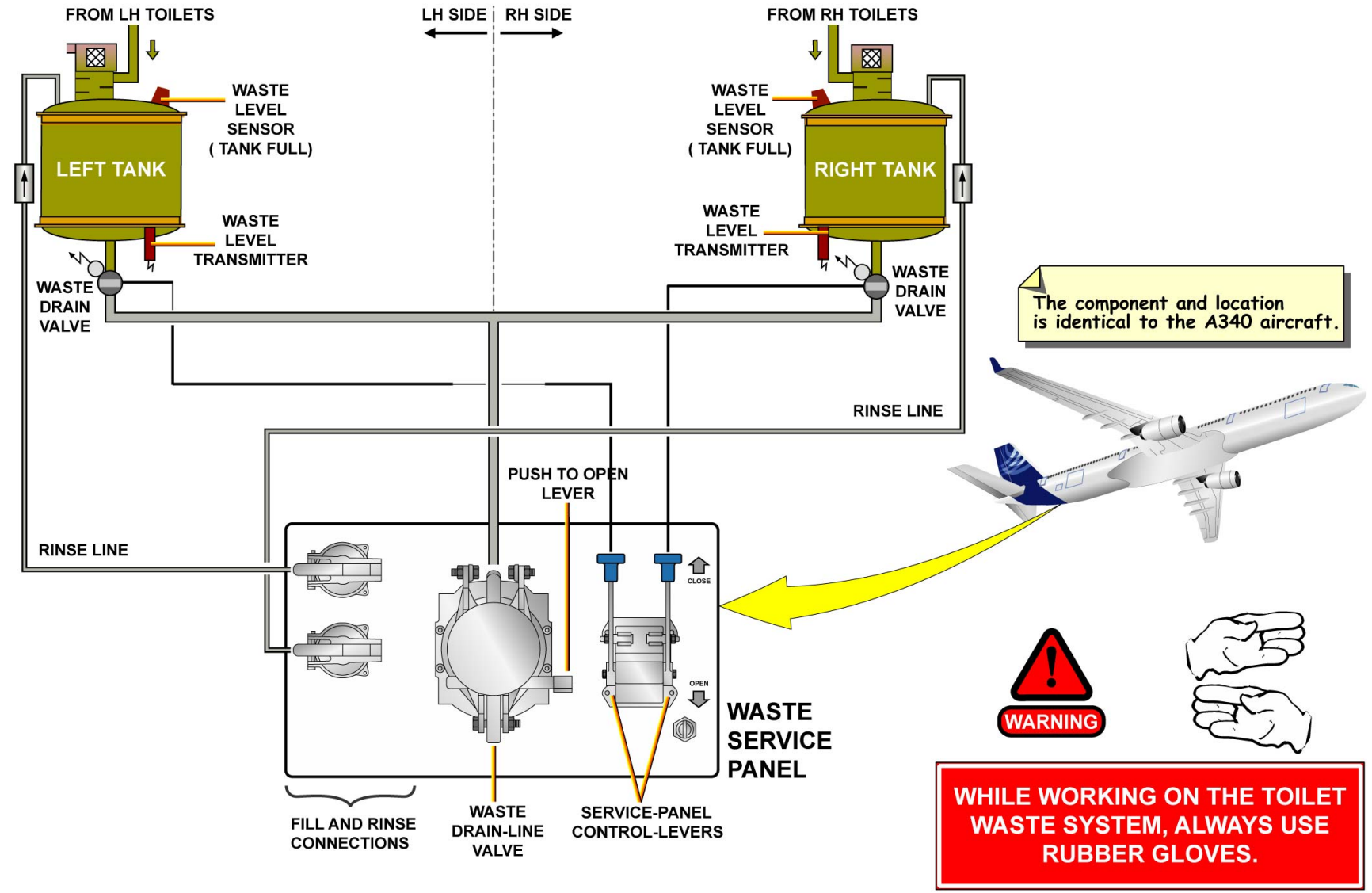

SERVICING - TOILET WASTE TANK SERVICING GENERAL

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WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

TOILET WASTE TANK SERVICING, DRAINING OF THE SYSTEM

At the waste service panel, open the cap of the waste drain line valve. Connect the waste servicing cart hose to the waste drain line connection. Set the PUSH TO OPEN lever at the waste drain line valve to OPEN. Set the service panel control levers to OPEN and let the tanks fully drain.

NOTE: When the waste service panel door is opened on ground, the limit SW sends a signal to the VSC to deactivate the toilet system.

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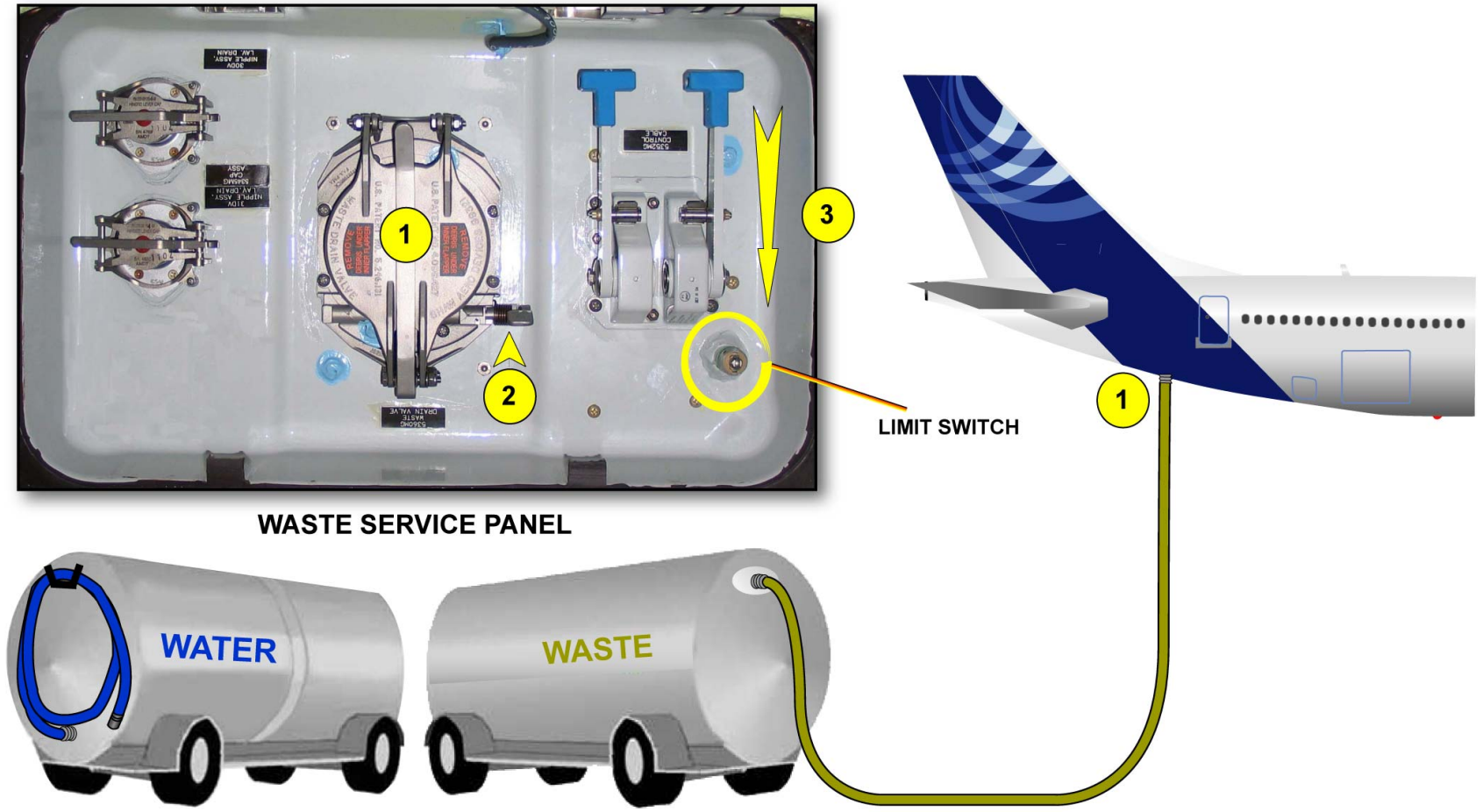
1. Connect the toilet-servicing cart to the waste-tank drain connection.
2. Push the PUSH TO OPEN lever to open the waste drain line valve.
3. Put the waste drain valve control-levers to the OPEN position.



WASTE SERVICE PANEL

SERVICING - TOILET WASTE TANK SERVICING, DRAINING OF THE SYSTEM

WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

SERVICING (continued)

TOILET WASTE TANK SERVICING, FLUSHING OF THE WASTE HOLDING TANKS

Connect the flush/fill hose from the water servicing cart to one fill and rinse connection. To rinse the tank with clean water, operate the cart-servicing toilet at a stable water pressure of 2.4 bar (35 psi) and stable flow rate of 38.0 l (10.0 US gal) per minute.
Flush the waste holding tank with 100 l (26.5 US gal) of water and repeat the rinsing procedure for each tank.

NOTE: During the rinse procedure, the water removes the unwanted material from the walls of the tank and the waste level sensors.

Set the service panel control levers back to CLOSE. Close the caps of the waste drain-line valve. Fill each tank with 18 l of disinfectant through its fill and rinse connection. Remove the waste drain hose, flush filling hose and close all caps and access door.
Do not discharge products such as oil, fuel, solvent, lubricant either in trash bins, soil or into the water network (drains, gutters, rain water, waste water, etc...). Sort waste fluids and use specific waste disposal containers.

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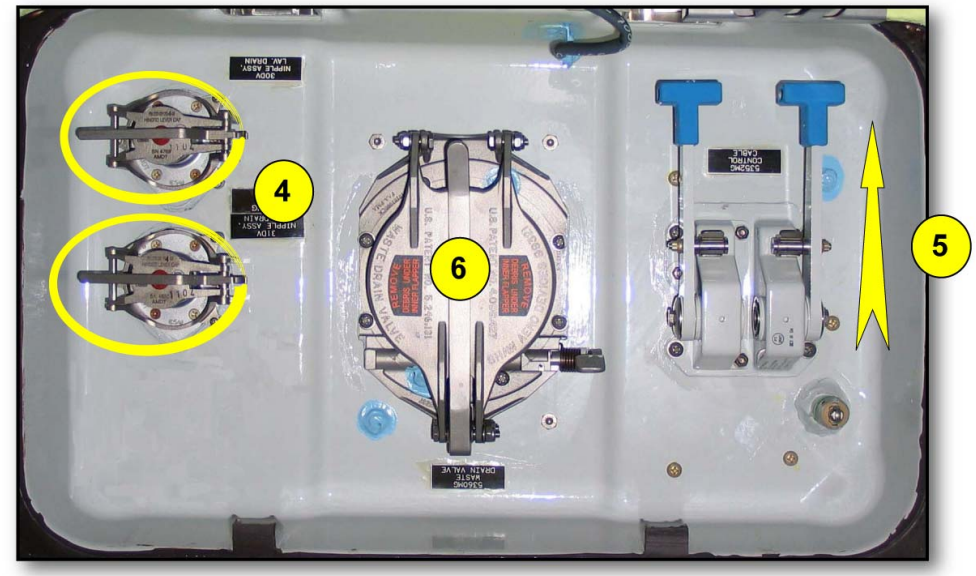
④ Connect the flush/fill hose of the toilet-servicing cart to a fill and rinse connection.
Flush the waste holding tanks with 100L of water for each tank.



WASTE SERVICE PANEL

SERVICING - TOILET WASTE TANK SERVICING, FLUSHING OF THE WASTE HOLDING TANKS

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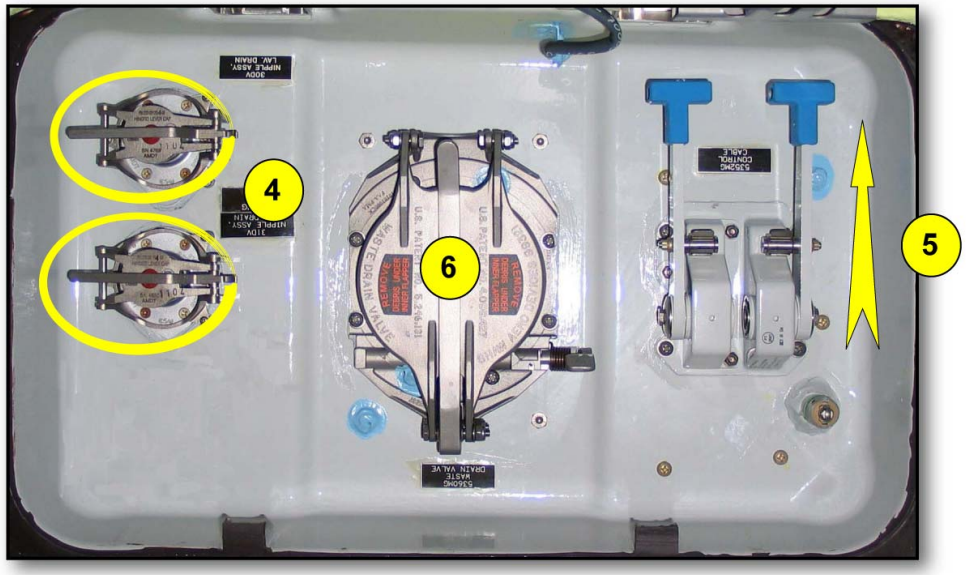
④ Connect the flush/fill hose of the toilet-servicing cart to a fill and rinse connection.
Flush the waste holding tanks with 100L of water for each tank.



WASTE SERVICE PANEL

SERVICING - TOILET WASTE TANK SERVICING, FLUSHING OF THE WASTE HOLDING TANKS

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WATER AND WASTE LINE MAINTENANCE BRIEFING (2)

MAINTENANCE TIPS

COLD WEATHER MAINTENANCE PRACTICES FOR WATER AND WASTE SYSTEM

In cold weather conditions the water and waste system must be drained to prevent damage to the system by ice. To decide if the water and waste system needs to be drained, we must refer to the water and waste system drain configuration table in the AMM 12-31-38. After draining of the system and parking of the aircraft at temperatures below 0 °C (32.00 °F):
- let the drain valves and the service panels stay open to let remaining fluid flow out,
- do not install the caps on the drain and the fill/drain nipples.

NOTE: Although an aircraft is resistant to very low ambient temperatures, the cabin air conditioning and WIPU system keep the pipes and water systems sufficiently warm to prevent these systems from freezing. However, when the aircraft is not energized or stays on the ground at sub-zero temperatures, you must do additional procedures to prevent damage to the systems by ice. If the service panels or caps are frozen closed, you must not use force to open or release them. You must apply hot air to melt ice.

The cold weather maintenance practices for the potable water system are given in the AMM 12-31-38.
Pre-flight (first flight of the day):
- fill the potable water system with warm potable water of 30 °C (86.00 °F) not earlier than 30 minutes before the engine start,
- remove excessive water from around the service panel before you close it,
- pre-charge the waste holding tanks not earlier than 30 minutes before the engine start. Use a cart servicing, toilet to fill each waste holding tank with 18 l (4.8 US gal) of disinfectants (Material No.14-001A),
- remove excessive liquid from around the service panel before you close it.

Post flight (Last flight of the day but not transit stops):

CAUTION: DO NOT OPEN THE ELECTRICAL DRAIN VALVES FOR LONGER THAN NECESSARY IF YOU USE THE APU OR ENGINE(S)TO PRESSURIZE THE SYSTEM. IF THE VALVES STAY OPEN TOO LONG, THE HOT BLEED AIR CAN CAUSE DAMAGE TO THE TANK QUANTITY TRANSMITTER.

If you park the aircraft at very low temperature, drain the water from the potable water system and remove the remaining water from the potable water system, as stated below:
- drain the potable water system,
- close all the lavatory and galley manual shutoff valves,
- close all the potable-water drain and fill drain valves,
- pressurize the potable water system.

To remove the remaining water from the potable water system do the procedure as follows:

NOTE: This procedure is the same for all lavatories and galleys, which have potable water supplied equipment (as there are water heater, coffeemaker and water faucet).

- open one related manual shutoff valve of one lavatory or galley,
- operate the faucet (HOT and COLD),
- make sure that air but no water comes out of the faucet,
- flush the toilet as often as necessary until you are sure that air but no water comes out of the toilet rinse valve,
- close the related manual shutoff valve,
- do the whole procedure for all lavatories and galleys which have potable-water supplied equipment.
- open all drain valves of the potable water system and release the pressure from the potable water system,
- open the manual shutoff valves in all lavatories or galleys.

G9409341 - GAUT0T0 - FM38B1000000001

If you cannot drain the potable water system, do the pre-conditioning of the aircraft according to the AMM table.

CAUTION: DO NOT OPEN THE ELECTRICAL DRAIN VALVES FOR LONGER THAN NECESSARY IF YOU USE THE APU OR ENGINE(S)TO PRESSURIZE THE SYSTEM. IF THE VALVES STAY OPEN TOO LONG, THE HOT BLEED AIR CAN CAUSE DAMAGE TO THE TANK QUANTITY TRANSMITTER.

G9409341 - GAUT0T0 - FM38B1000000001

REFERENCE AMM TABLE: 12-31-38				
CONFIGURATION			COLD SOAK TIME (HOURS:MIN)	WATER AND WASTE TANKS DRAIN
AIR CONDITIONING	AIR TEMPERATURE	OUTSIDE AIR TEMPERATURE		
ON	ABOVE 10 deg.C (50 deg.F)	BETWEEN 0 AND -15 deg.C (32 AND 5 deg.F)	ANY	NOT REQUIRED
		BELOW -15 Deg.C (5 deg.F)	1 : 15	REQUIRED
OFF		BETWEEN 0 AND -7 deg.C (32 AND 19,4 deg.F)	1 : 30	
		BETWEEN -7 AND -15 deg.C (19.4 AND 5 deg.F)	0 : 30	
		BELOW -15 Deg.C (5 deg.F)	ANY	

MAINTENANCE TIPS - COLD WEATHER MAINTENANCE PRACTICES FOR WATER AND WASTE SYSTEM

G9409341 - GAUT0T0 - FM38B1000000001

REFERENCE AMM TABLE: 12-31-38				
OUTSIDE AIR TEMPERATURE	EXTERNAL HEAT SOURCE	APU	SUPERVISOR	DRAINING OF WATER SYSTEM
0 deg.C (32 deg.F) to -5 deg.C (23 deg.F)	1 HOUR EVERY 4 HOURS	NO	NO	NO
-5 deg.C (23 deg.F) to -10 deg.C (14 deg.F)	2 HOURS EVERY 4 HOURS	NO	NO	NO
-10 deg.C (14 deg.F) to -15 deg.C (5 deg.F)	CONTINUOUS	NO	NO	NO
BELOW -15 deg.C (5 deg.F)	CONTINUOUS	AS REQUIRED	YES	YES

MAINTENANCE TIPS - COLD WEATHER MAINTENANCE PRACTICES FOR WATER AND WASTE SYSTEM

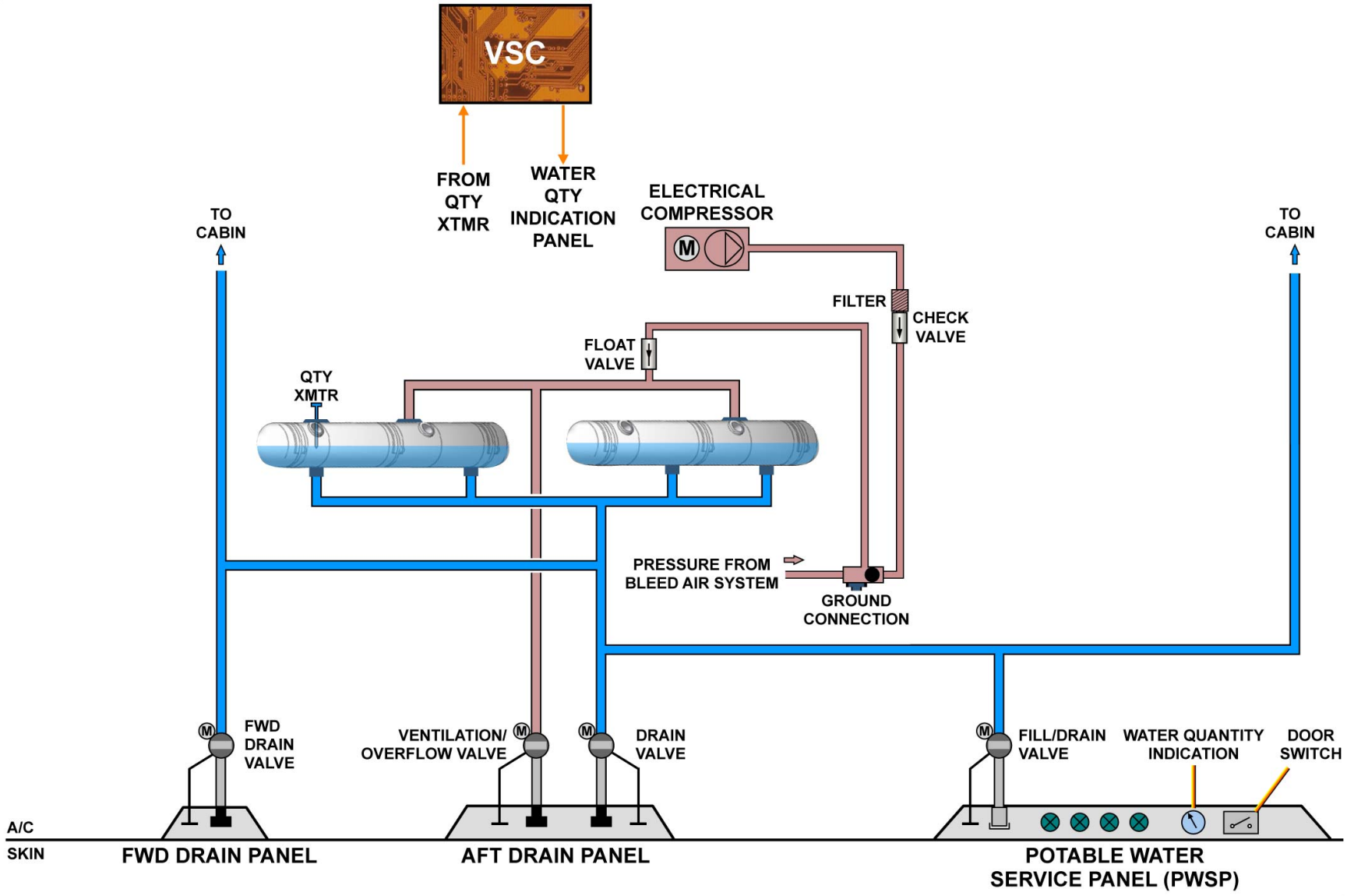
G9409341 - GAUT0T0 - FM38B1000000001

POTABLE WATER SYSTEM D/O (3)

STORAGE

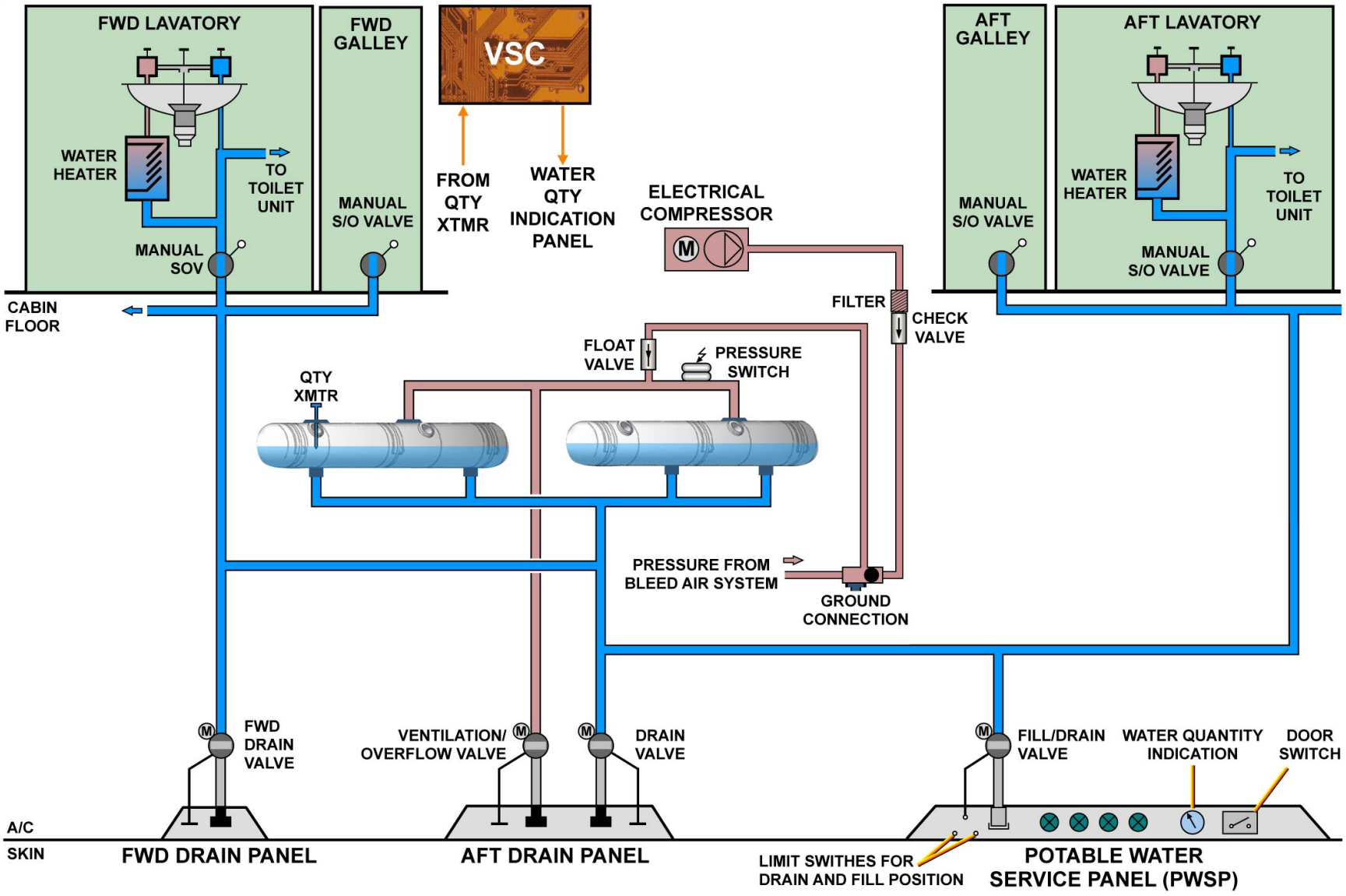
Two potable water tanks are installed in the pressurized zone of the A/C in the aft cargo compartment.
The tanks have a capacity of 350 liters (92.46 US gallons). They have connections for filling, draining and distribution ports and with an overflow and venting port connected to the pressurization system. Any tank can supply water to any galley and lavatory.

G9409341 - GAUT0T0 - FM38D1000000003



STORAGE

G9409341 - GAUT0T0 - FM38D1000000003



STORAGE

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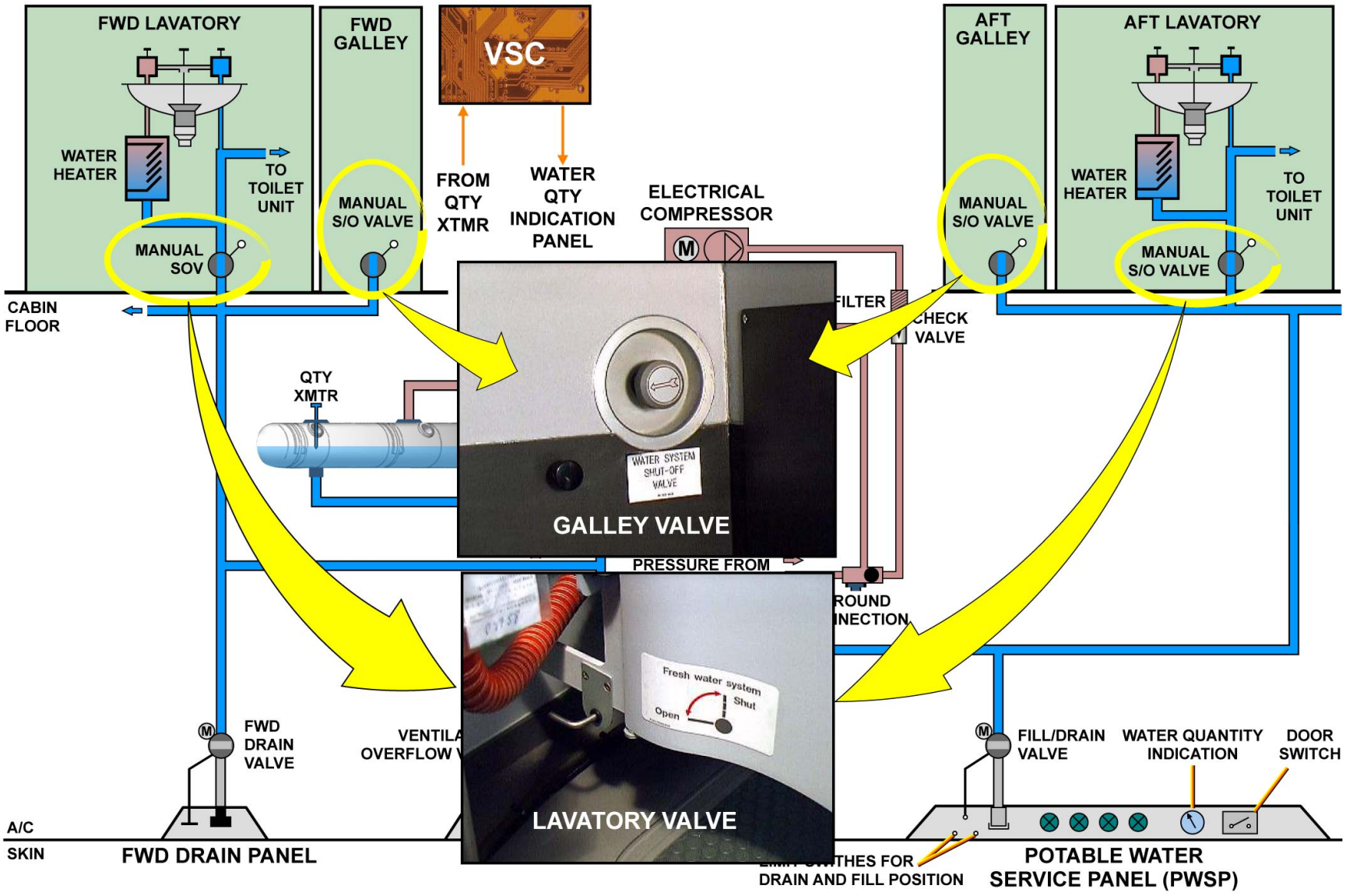
G9409341 - GAUT0T0 - FM38D1000000003

POTABLE WATER SYSTEM D/O (3)

DISTRIBUTION

The lavatory and galley distribution lines run below the passenger compartment floor. They are shrouded and insulated, or insulated and heated. Manual water Shut-Off Valves (SOVs) can be manually set to close in order to isolate a lavatory or a galley.

G9409341 - GAUT0T0 - FM38D1000000003



DISTRIBUTION

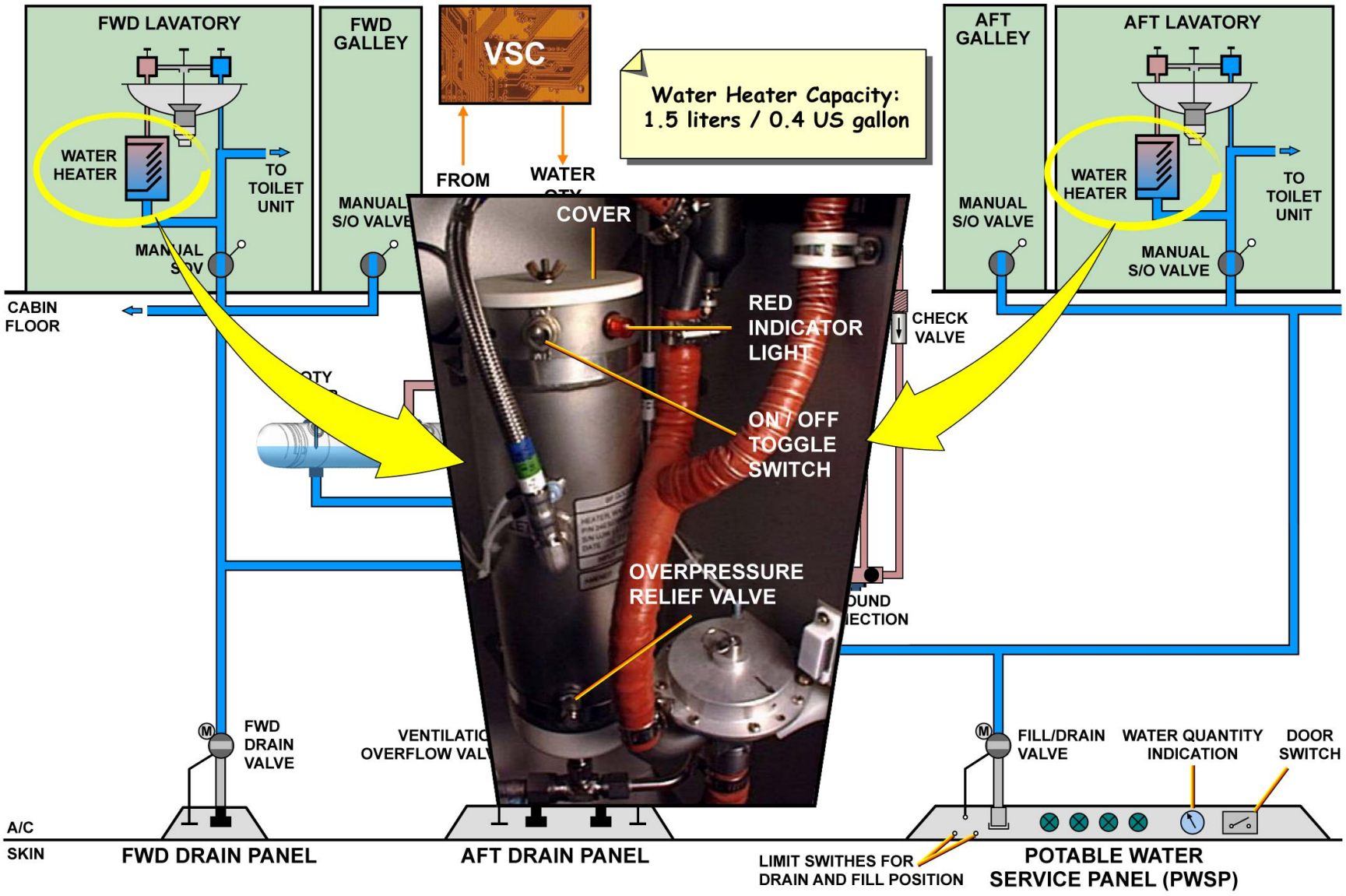
G9409341 - GAUT0T0 - FM38D1000000003

POTABLE WATER SYSTEM D/O (3)

WATER HEATING

The water heater has a capacity of 1.5 liters (0.4 US gallons). It maintains the water temperature between 49°C (121°F) and 54°C (129°F). Water heating can be switched off by an ON/OFF toggle switch with an over-temperature switch, which operates at 77°C (171°F) and in case of low water quantity. This over-temperature switch can be reset by a P/B beneath the cover. A red indicator light shows water heating. An overpressure relief valve protects the water heater from overpressure.

G9409341 - GAUT0T0 - FM38D1000000003



WATER HEATING

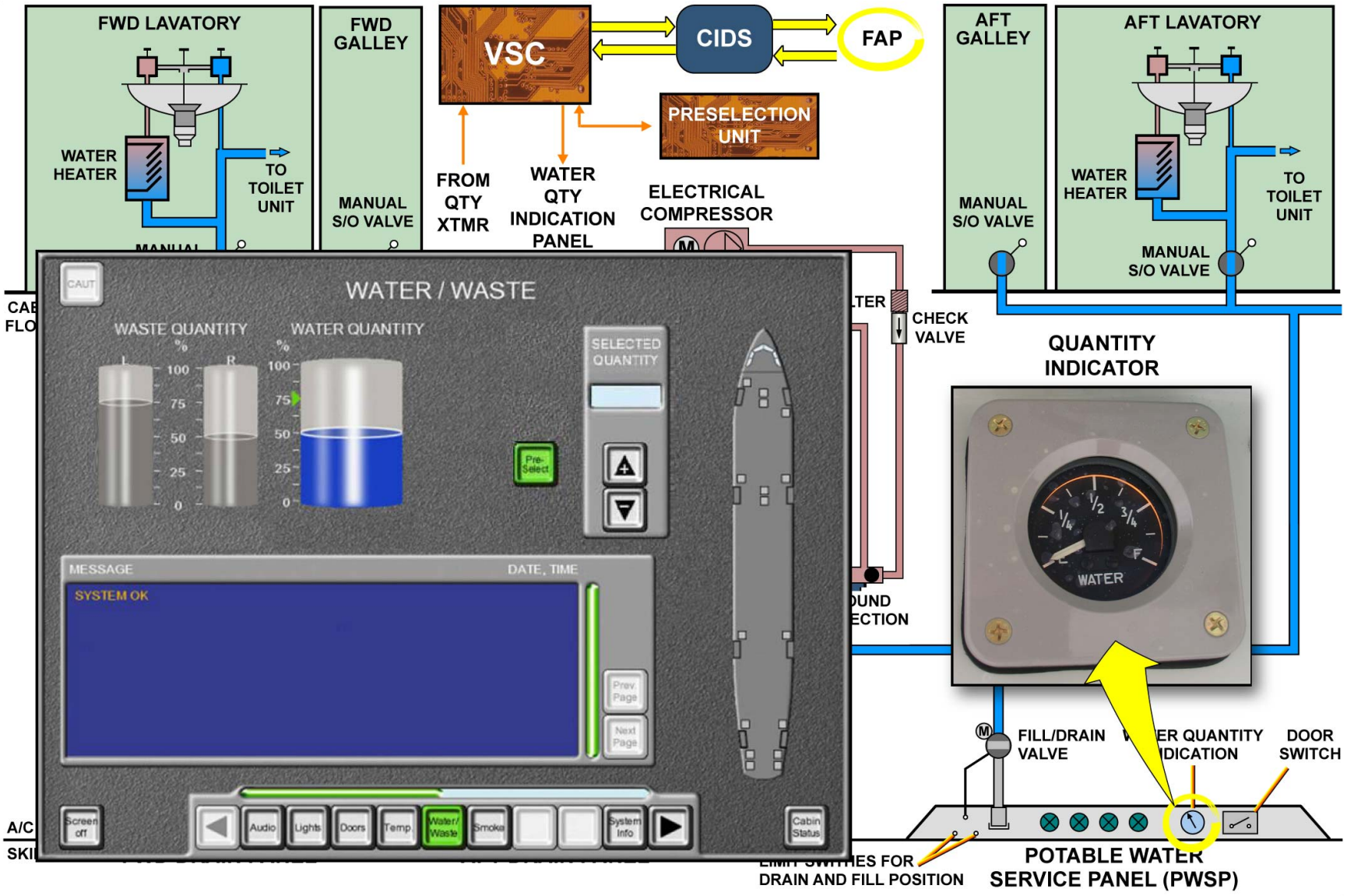
G9409341 - GAUT0T0 - FM38D1000000003

POTABLE WATER SYSTEM D/O (3)

INDICATING

The first tank has an ultrasonic unit quantity transmitter, which sends signals to the Vacuum System Controller (VSC). The VSC transmits the signal directly to the water indication panel on the Potable Water Service Panel (PWSP) and through the Cabin Intercommunication Data System (CIDS) to the Flight Attendant Panel (FAP). The VSC transmits the potable water quantity pre-selection signal from the FAP to the pre-selection unit. The indication panel has an indicator. Note that the indication panel is optional.
The display unit on the FAP shows:
- the water quantity,
- the condition of the potable water system,
- the pre-selection value,
- the possible failure messages of the system.

G9409341 - GAUT0T0 - FM38D1000000003


FWD LAVATORY
WATER HEATER
TO TOILET UNIT
FWD GALLEY
MANUAL S/O VALVE
VSC
CIDS
FAP
PRESELECTION UNIT
FROM QTY XTMR
WATER QTY INDICATION PANEL
ELECTRICAL COMPRESSOR
AFT GALLEY
MANUAL S/O VALVE
AFT LAVATORY
WATER HEATER
TO TOILET UNIT
MANUAL S/O VALVE
CHECK VALVE
QUANTITY INDICATOR
WATER / WASTE
WASTE QUANTITY
WATER QUANTITY
SELECTED QUANTITY
Pre-Select
MESSAGE
DATE, TIME
SYSTEM OK
Prev Page
Next Page
Screen off
Audio
Lights
Doors
Temp
Water/ Waste
Smoke
System Info
Cabin Status
WATER
FILL/DRAIN VALVE
DOOR SWITCH
DRAIN AND FILL POSITION
POTABLE WATER SERVICE PANEL (PWSP)

INDICATING

POTABLE WATER SYSTEM D/O (3)

FILLING

Filling can be done with or without electrical power.

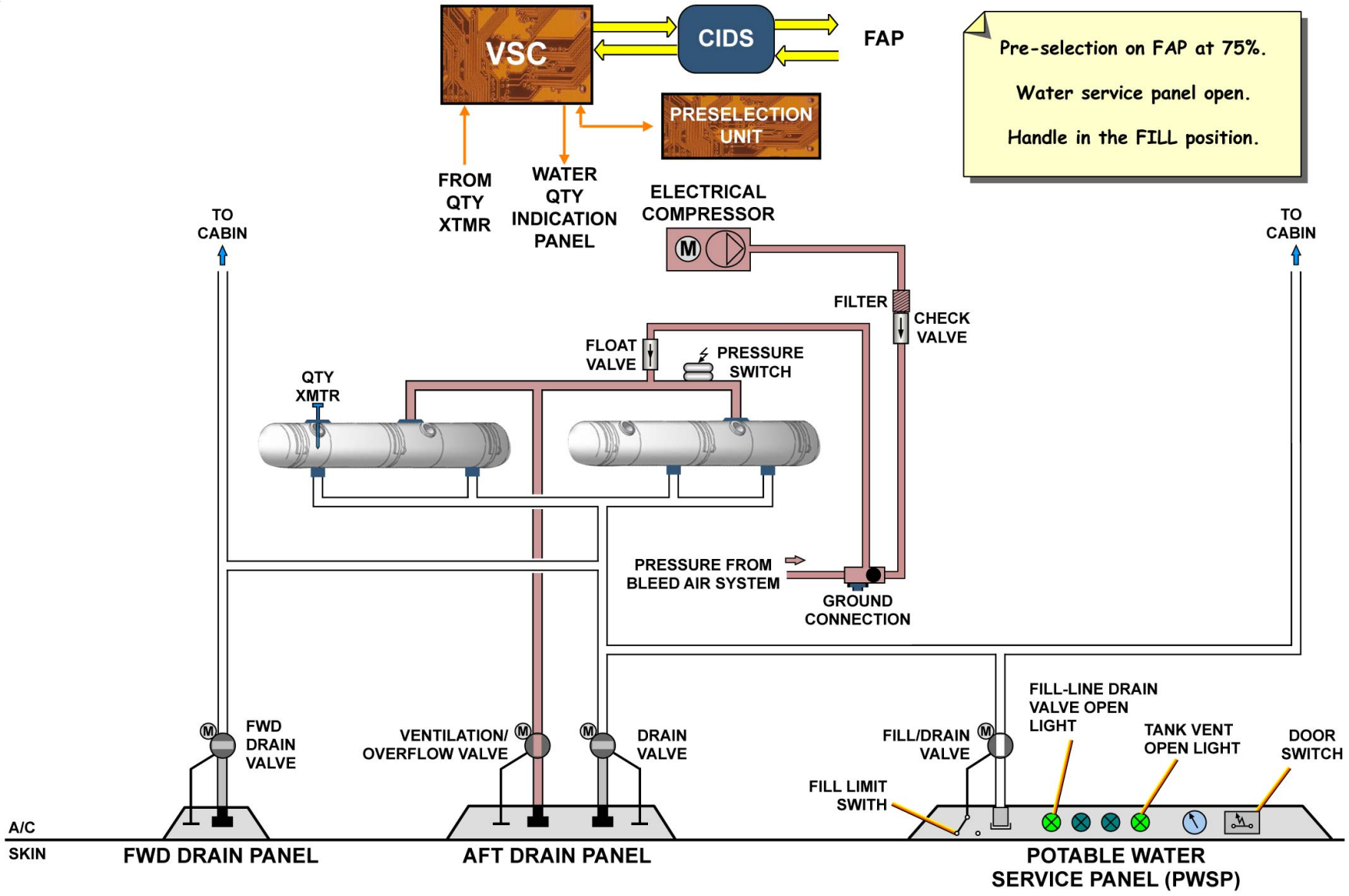
WITH ELECTRICAL POWER

On the FAP, the pre-selection level can be set to 25%, 50%, 75% or 100%. On the PWSP, turn the control handle from NORMAL to the FILL position. Then, fill/drain valve and the ventilation/overflow valve open electrically. The "FILL-LINE DRAIN VALVE OPEN" control light and the "TANK VENT OPEN" control lights come on. During filling, the water quantity is transmitted from the VSC to the CIDS.

When the set value is reached, the "TANK FULL " control light for the two tanks comes on.

After the two tanks have reached the set level, the fill/drain valve closes, the control handle goes back to the NORMAL position automatically, and the "FILL-LINE DRAIN VALVE OPEN" control light goes off. The ventilation/overflow valve is closed electrically and the "TANK VENT OPEN" control light also goes off on the PWSP. The potable water filling is completed.

G9409341 - GAUT0T0 - FM38D1000000003



FILLING - WITH ELECTRICAL POWER

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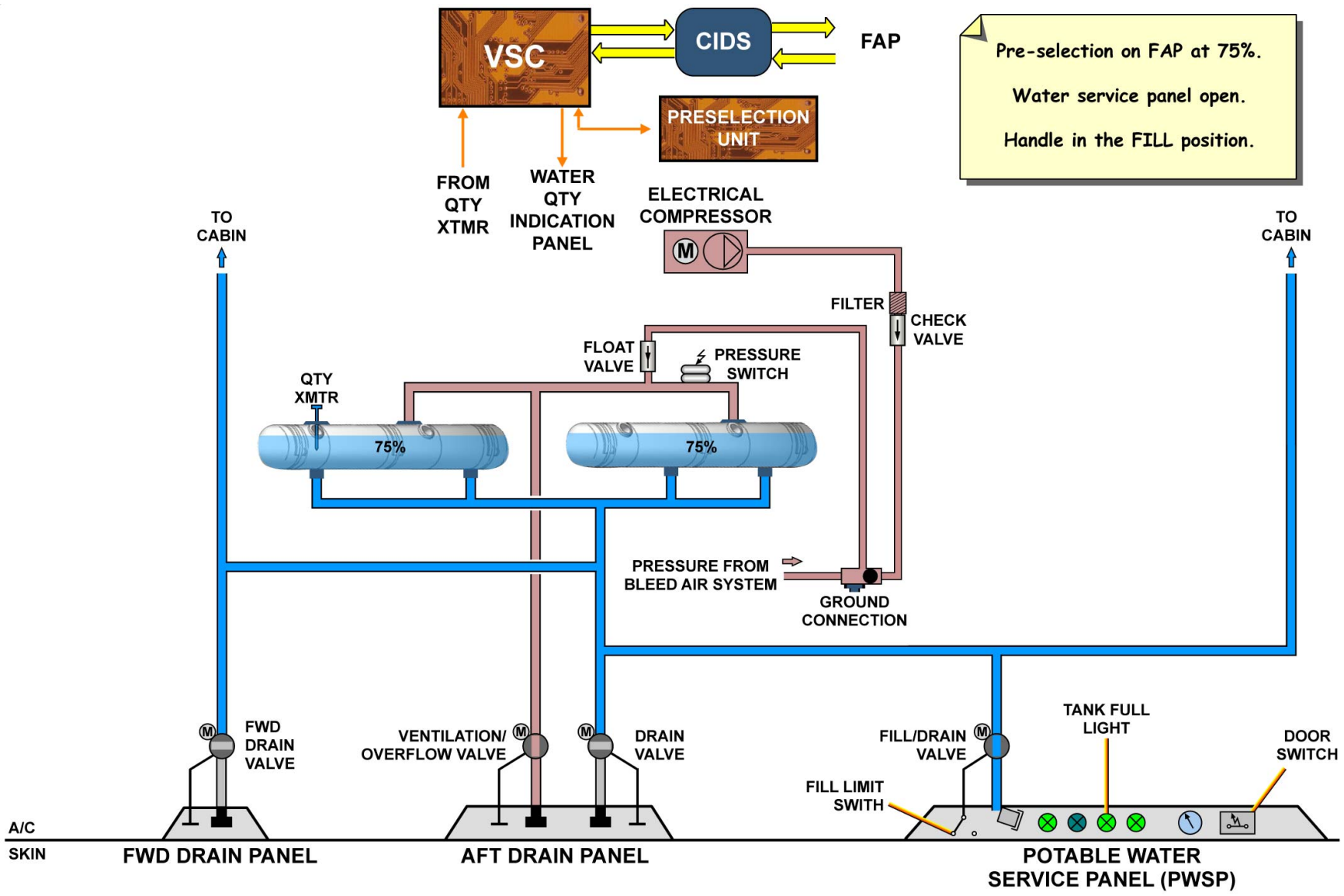
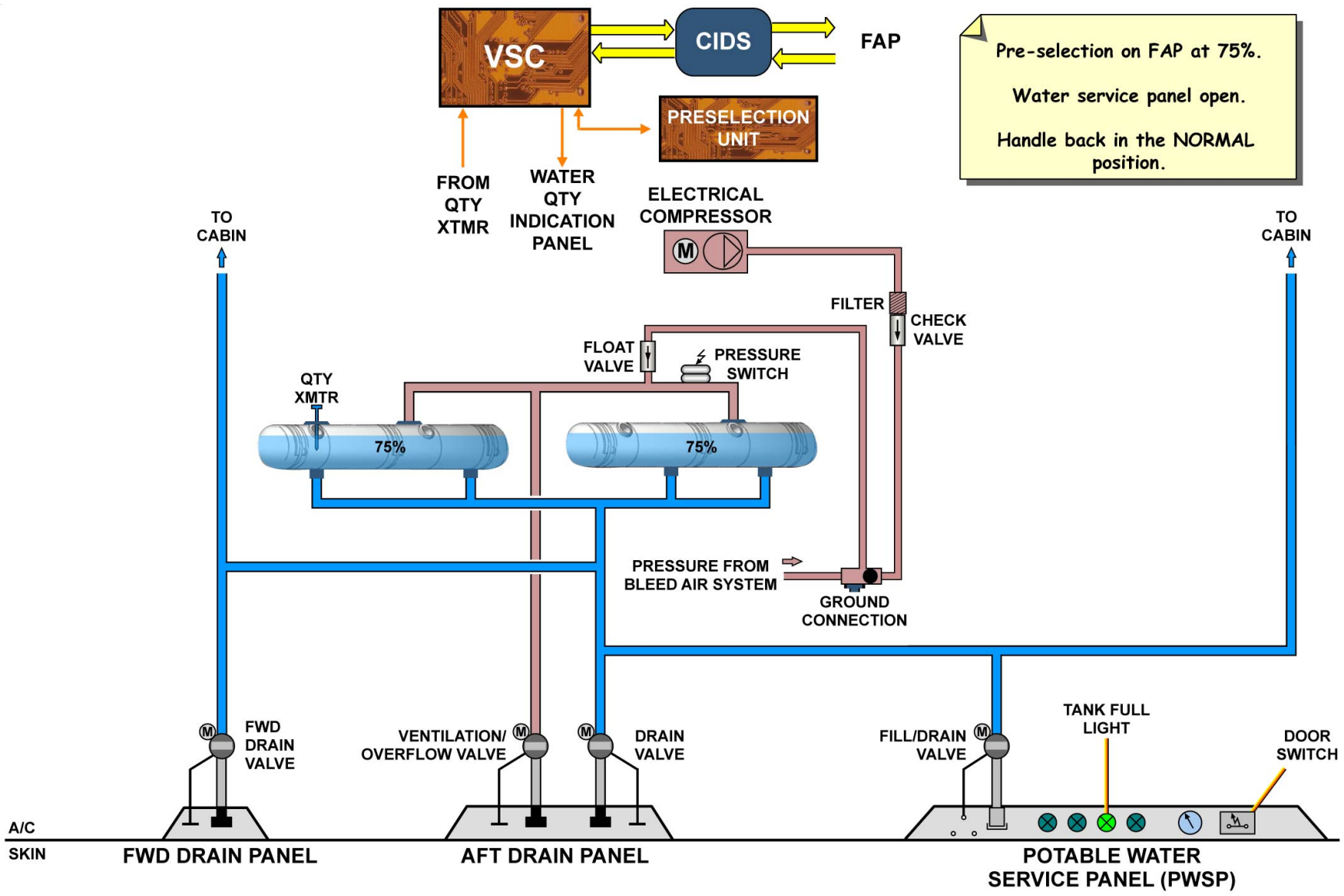


FILLING - WITH ELECTRICAL POWER

G9409341 - GAUT0T0 - FM38D1000000003



FILLING - WITH ELECTRICAL POWER

G9409341 - GAUT0T0 - FM38D1000000003

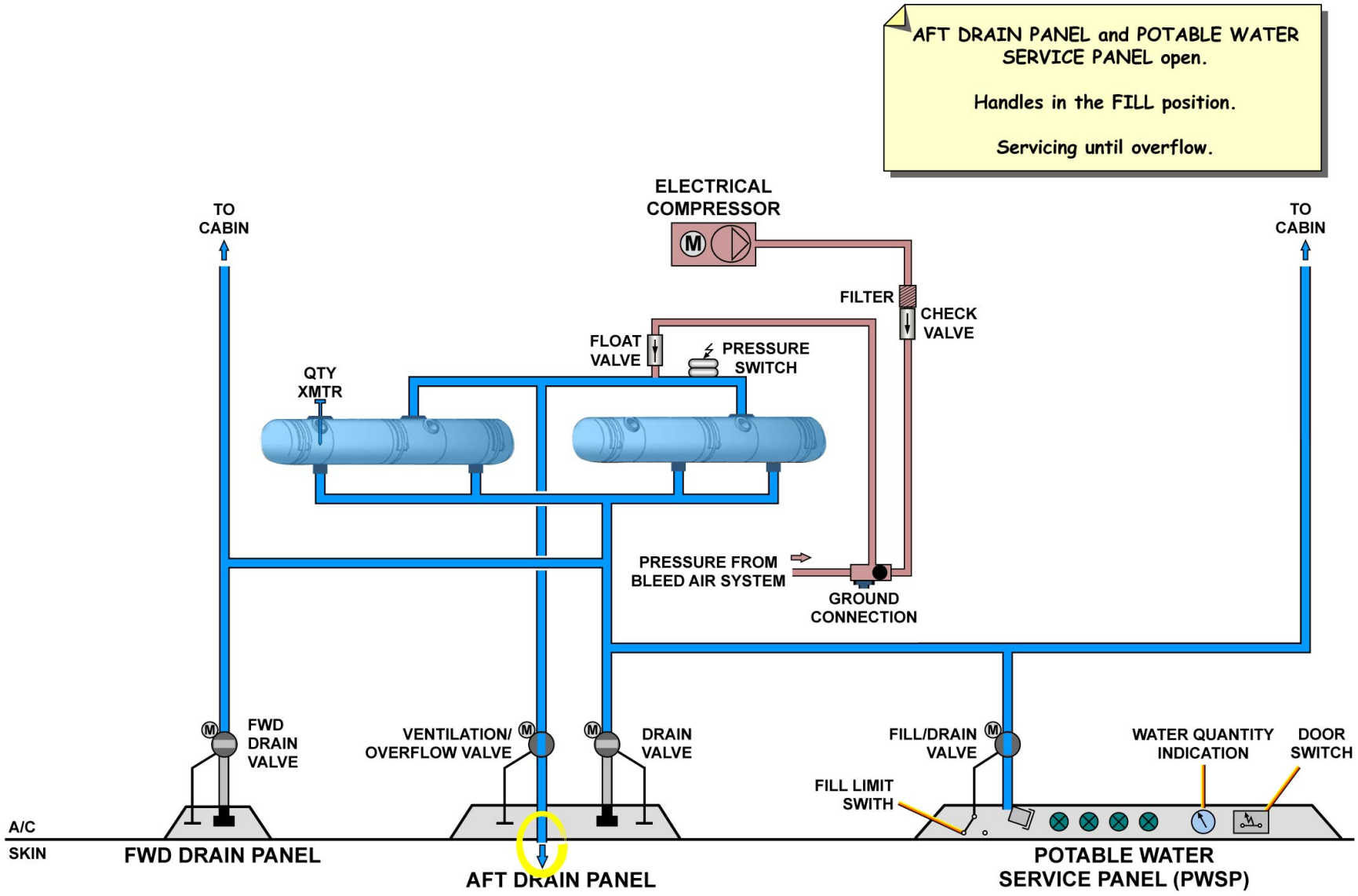
POTABLE WATER SYSTEM D/O (3)

FILLING (continued)

WITHOUT ELECTRICAL POWER

The fill/drain valve control handle on the PWSP is turned manually to the FILL position, and the ventilation/overflow valve control handle on the AFT drain panel is turned manually to the OPEN position.
Then, the fill/drain valve and the ventilation/overflow valves are open.
On the AFT drain panel, when the water flows out of the ventilation/overflow nipple, this indicates that the tanks are full and the control handles must be manually placed back into the CLOSE and NORMAL position.
No indication is given on the water quantity indication of the potable service panel.

G9409341 - GAUT0T0 - FM38D1000000003



FILLING - WITHOUT ELECTRICAL POWER

G9409341 - GAUT0T0 - FM38D1000000003

POTABLE WATER SYSTEM D/O (3)

DRAINING

Draining can be done with or without electrical power.

WITH ELECTRICAL POWER

On the Potable Water Service Panel (PWSP), when the fill/drain valve control handle is turned from the NORMAL to the DRAIN position, the fill/drain valve opens. On the AFT drain panel the ventilation/overflow valve and the drain valve open electrically, as well as the FWD drain valve on the FWD drain panel. Then, "FILL-LINE DRAIN VALVE OPEN", the "FWD DRAIN VALVE OPEN" and the "TANK VENT OPEN" control lights come on.
Water drains from the fill/drain port on the PWSP, from the AFT drain port on the AFT drain panel and from the drain port on the FWD drain panel.
When draining is complete, the fill and drain control handle must be manually placed back in the NORMAL position. The FWD drain valve, the AFT drain valve and the fill/drain valve close. The ventilation/overflow valve also closes automatically. The "FILL-LINE DRAIN VALVE OPEN", the "FWD DRAIN VALVE OPEN" and the "TANK VENT OPEN" control lights go off.

CAUTION: MAKE SURE THAT THE DRAIN VALVES STAY OPEN AFTER YOU DRAIN THE SYSTEM. THIS PREVENTS DAMAGE TO THE SYSTEM IN FREEZING CONDITIONS.

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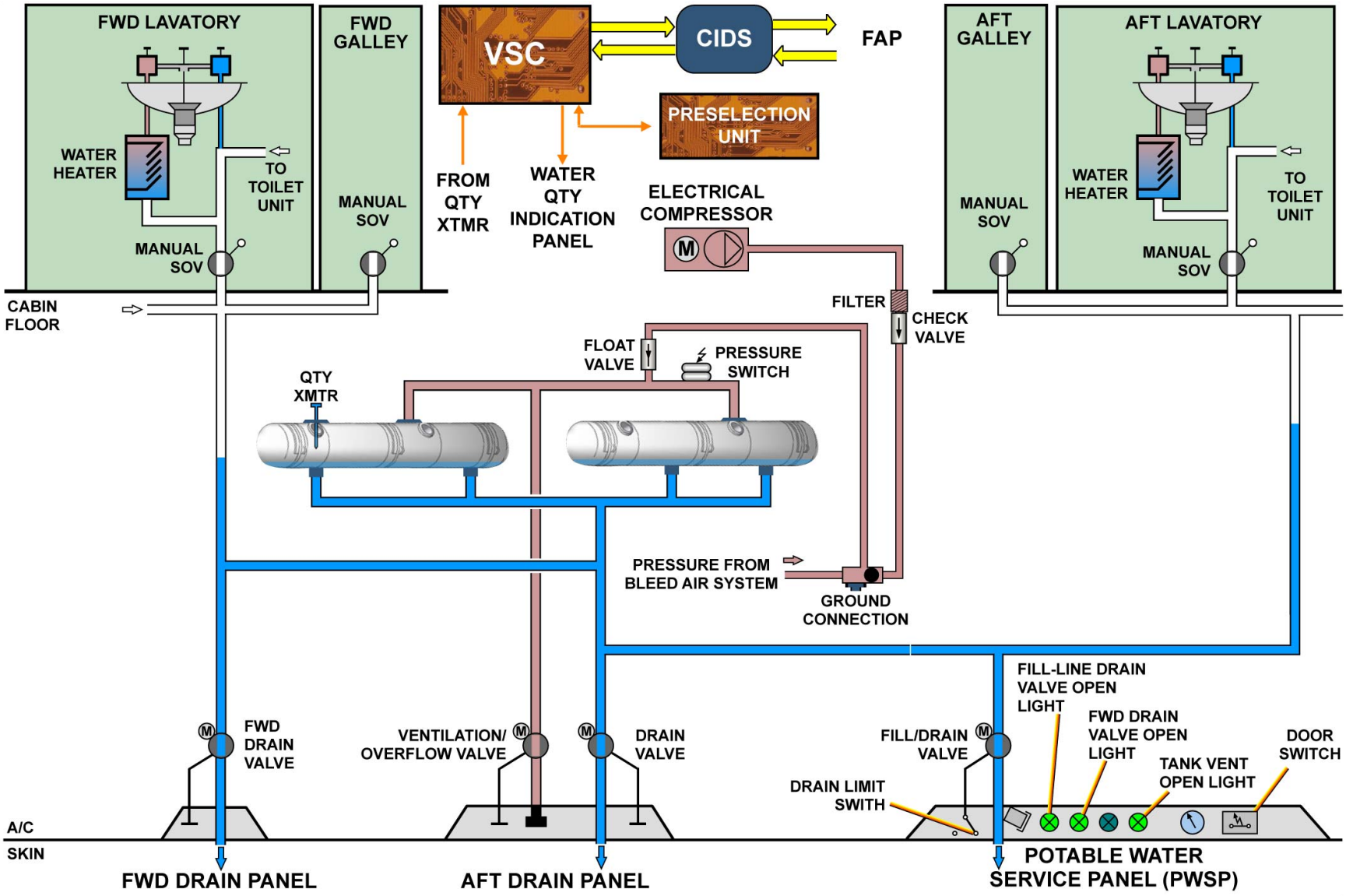

DRAINING - WITH ELECTRICAL POWER

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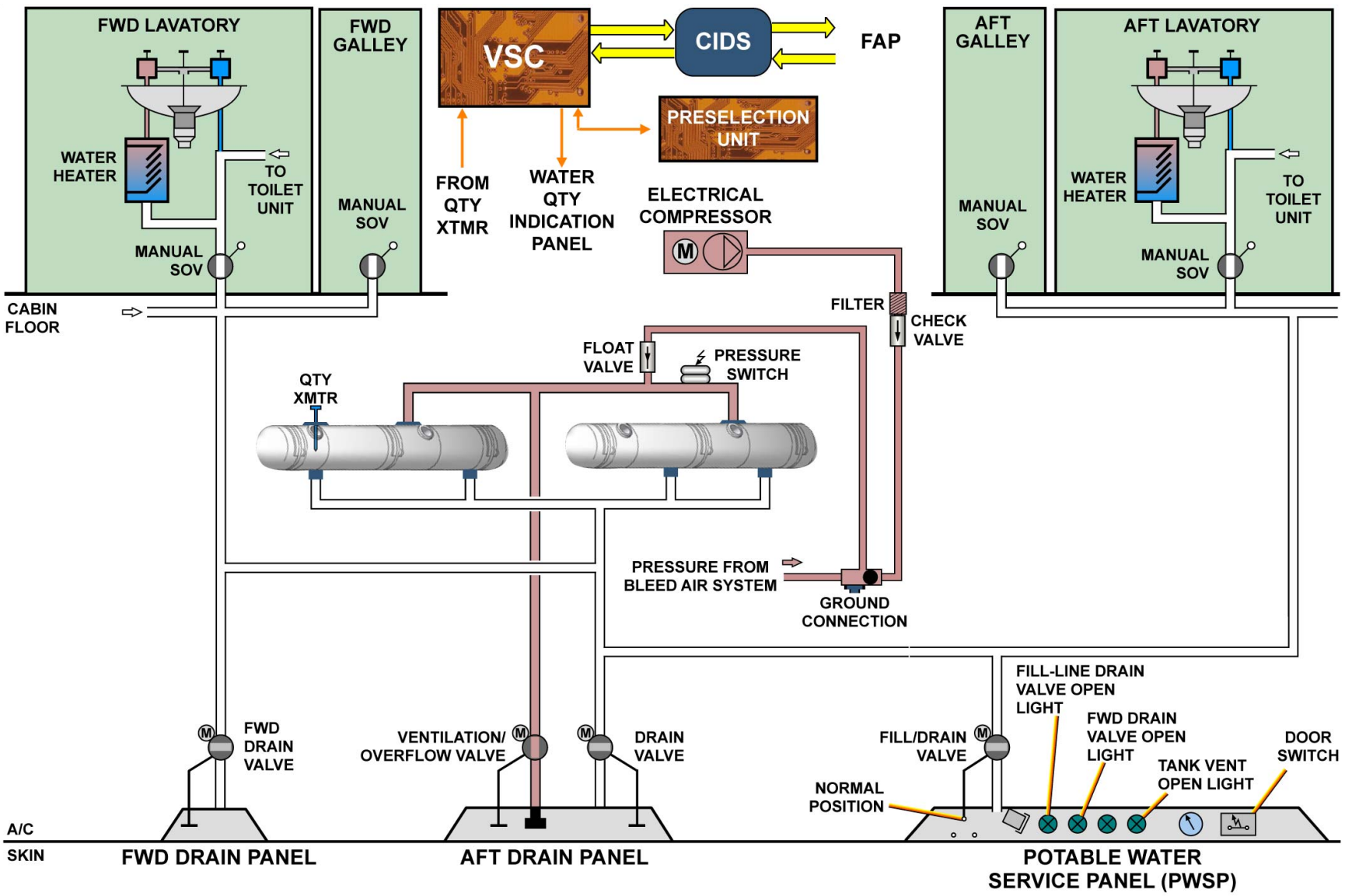

DRAINING - WITH ELECTRICAL POWER

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POTABLE WATER SYSTEM D/O (3)

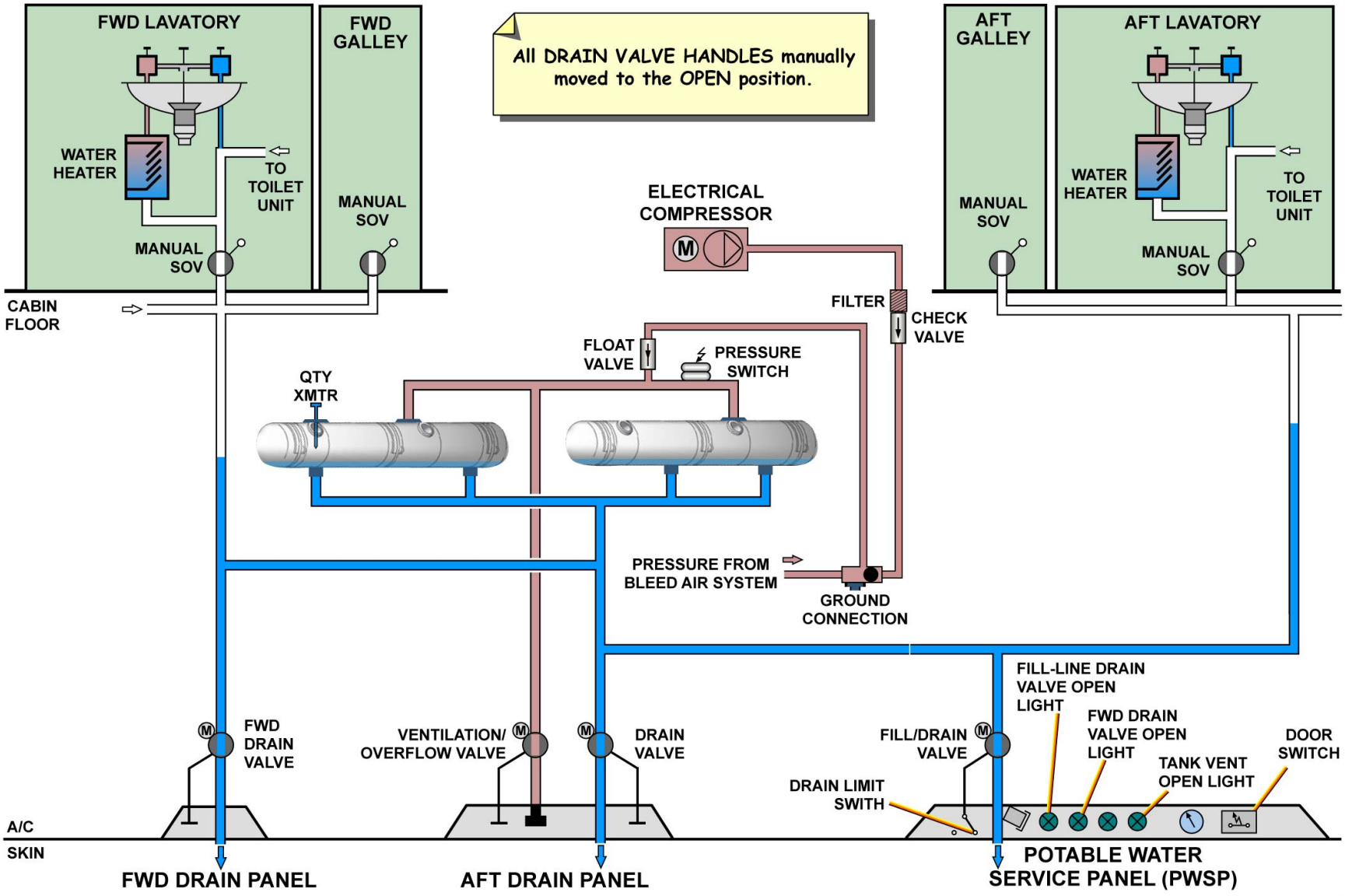
DRAINING (continued)

WITHOUT ELECTRICAL POWER

The fill/drain valve control handle is manually set from the NORMAL to the DRAIN position. Pull it out to the mechanical stop to open the fill/drain valve. Water drains from the fill/drain port on the PWSP.
Afterwards, on the AFT drain panel, the ventilation/overflow valve and the drain valve are set to the OPEN position using the control handles. Water drains from the fill/drain port on the PWSP and from the drain port of the AFT drain panel.
Finally, the FWD drain valve is opened manually using the control handle on the FWD drain panel. Water drains from the drain port on the FWD drain panel. On the PWSP, no indication is given on the valves position.
When draining is complete, put all drain valves to the CLOSE position and afterwards set the control lever of the fill/drain valve to the NORMAL position.

CAUTION: MAKE SURE THAT THE DRAIN VALVES STAY OPEN AFTER YOU DRAIN THE SYSTEM. THIS PREVENTS DAMAGE TO THE SYSTEM IN FREEZING CONDITIONS.

G9409341 - GAUT0T0 - FM38D1000000003



DRAINING - WITHOUT ELECTRICAL POWER

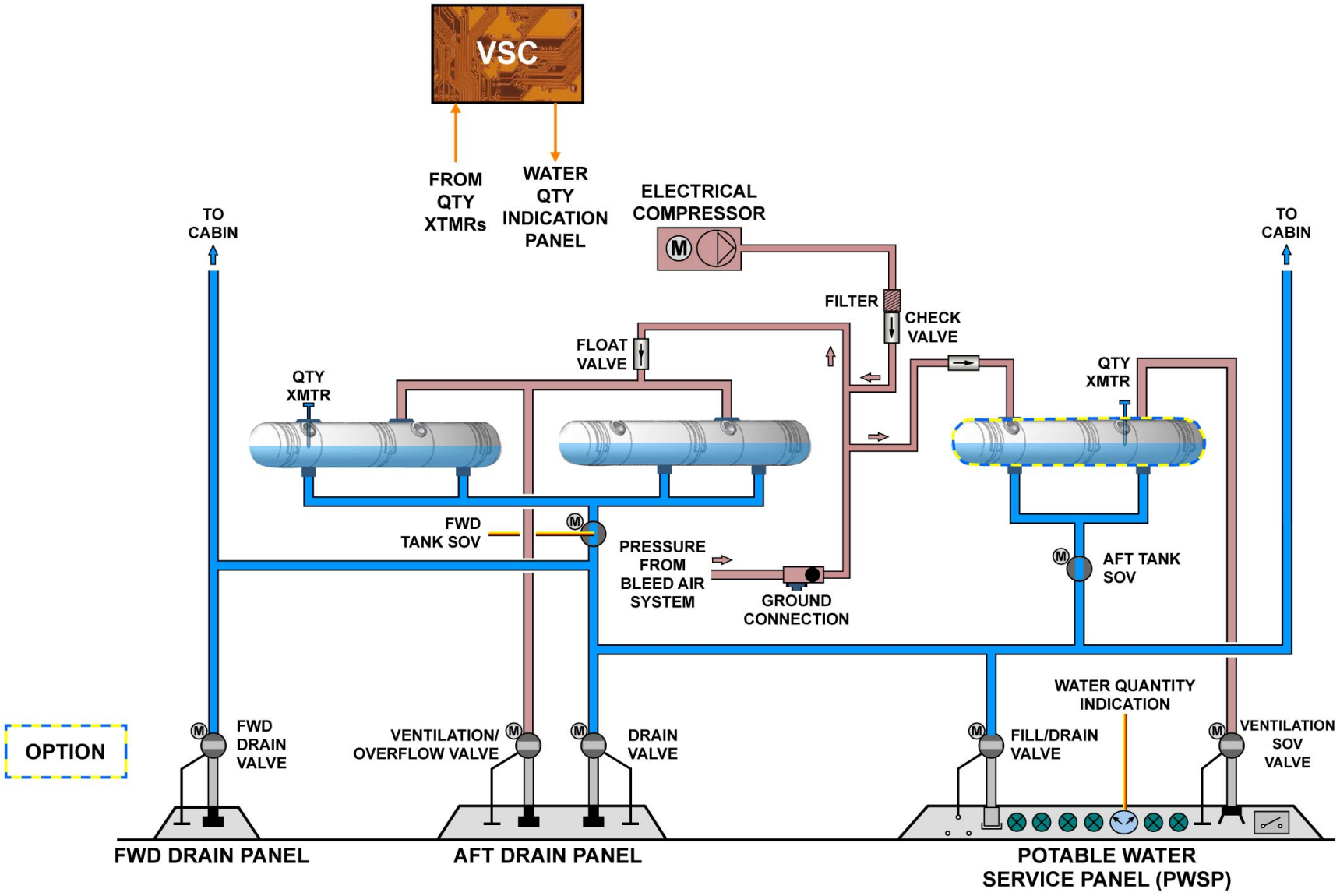
G9409341 - GAUT0T0 - FM38D1000000003

POTABLE WATER SYSTEM D/O (OPTION 3 TANKS) (3)

STORAGE

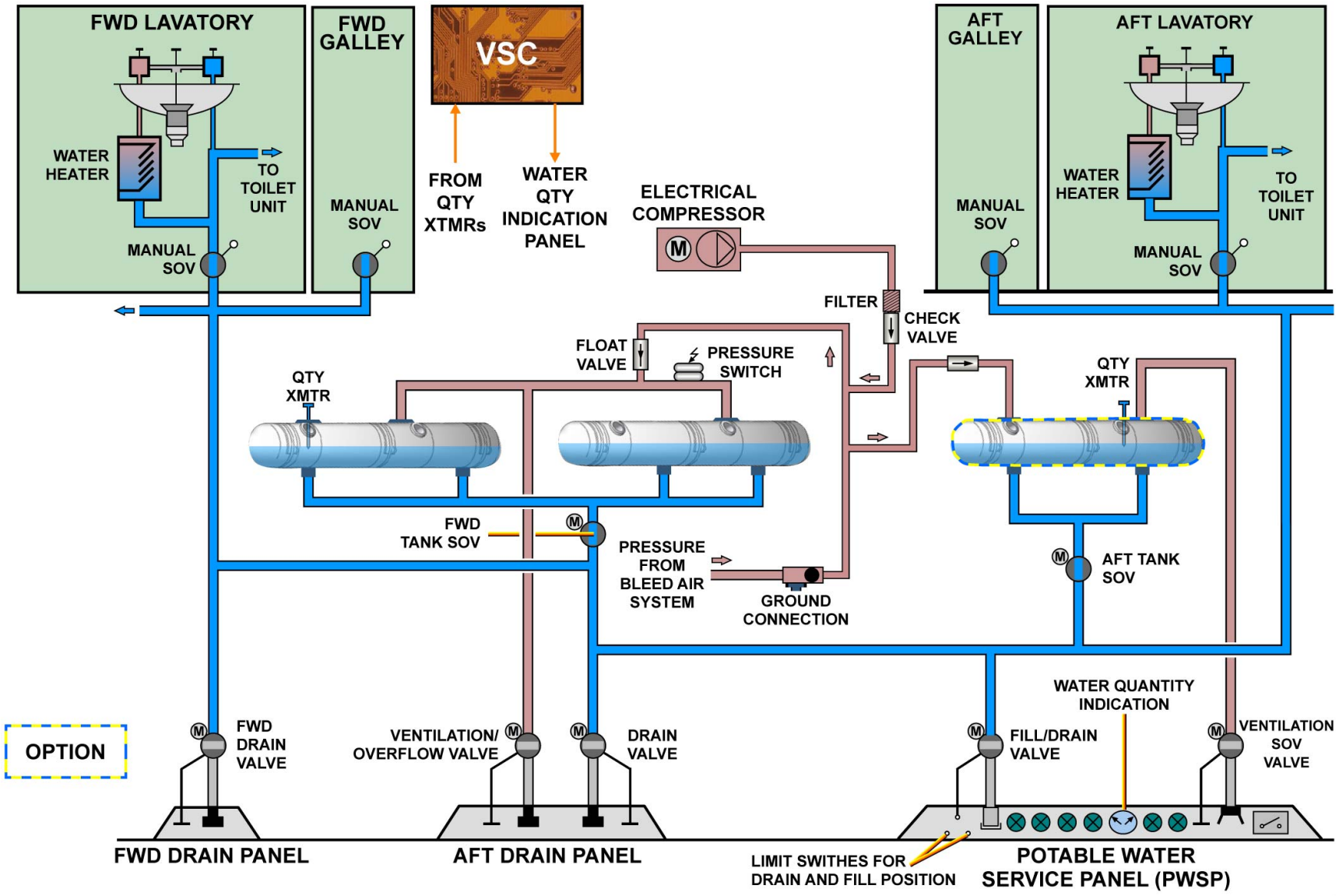
Three potable water tanks are installed in the pressurized zone of the A/C, two behind the aft cargo compartment on the right hand sidewall panels and one in the bulk cargo compartment.
The tanks have a capacity of 350 liters (92.46 US gallons). They have connections for filling, draining and distribution ports and with an overflow and venting port connected to the pressurization system. Any tank can supply water to any galley and lavatory.

G9409341 - GAUT0T0 - FM38D1000000004



STORAGE

G9409341 - GAUT0T0 - FM38D1000000004



STORAGE

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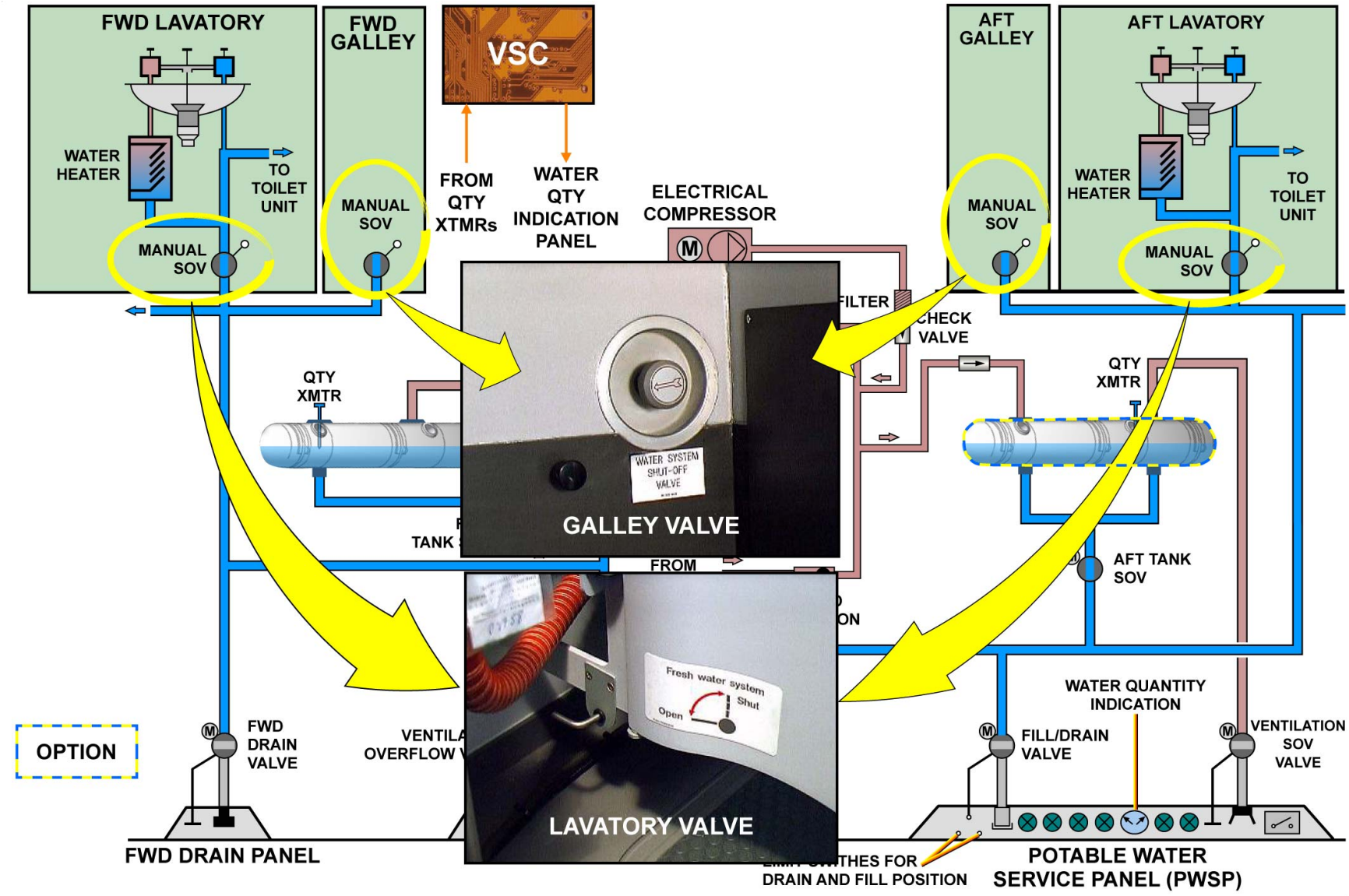
G9409341 - GAUT0T0 - FM38D1000000004

POTABLE WATER SYSTEM D/O (OPTION 3 TANKS) (3)

DISTRIBUTION

The lavatory and galley distribution lines run below the passenger compartment floor. They are shrouded and insulated, or insulated and heated. Manual water Shut-Off Valves (SOVs) can be manually set to close in order to isolate a lavatory or a galley.

G9409341 - GAUT0T0 - FM38D1000000004



DISTRIBUTION

G9409341 - GAUT0T0 - FM38D1000000004

POTABLE WATER SYSTEM D/O (OPTION 3 TANKS) (3)

WATER HEATING

The water heater has a capacity of 1.5 liters (0.4 US gallons). It maintains the water temperature between 49°C (121°F) and 54°C (129°F). Water heating can be switched off by an ON/OFF toggle switch with an over-temperature switch, which operates at 77°C (171°F) and in case of low water quantity. This over-temperature switch can be reset by a P/B beneath the cover. A red indicator light shows water heating. An overpressure relief valve protects the water heater from overpressure.

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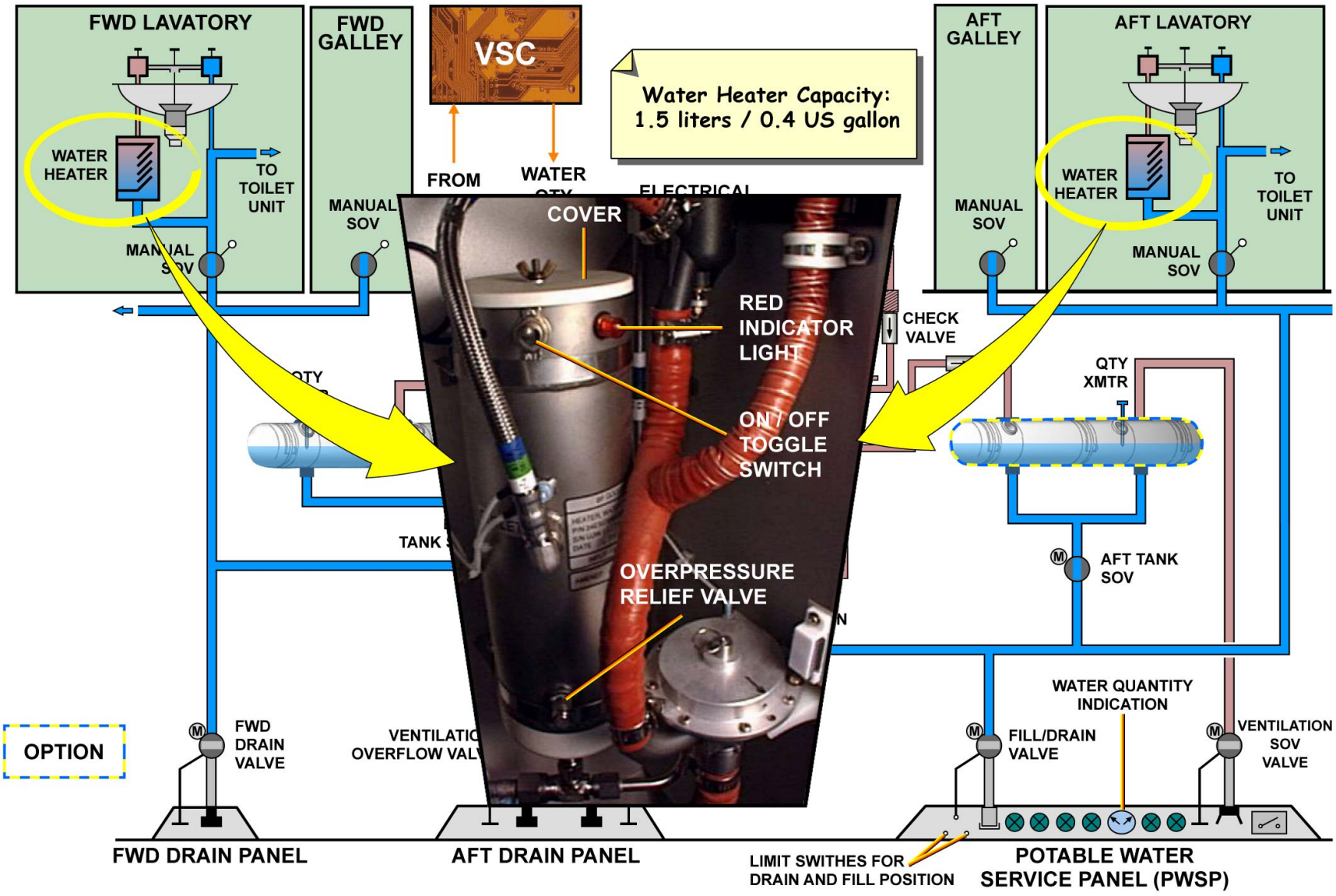


WATER HEATING

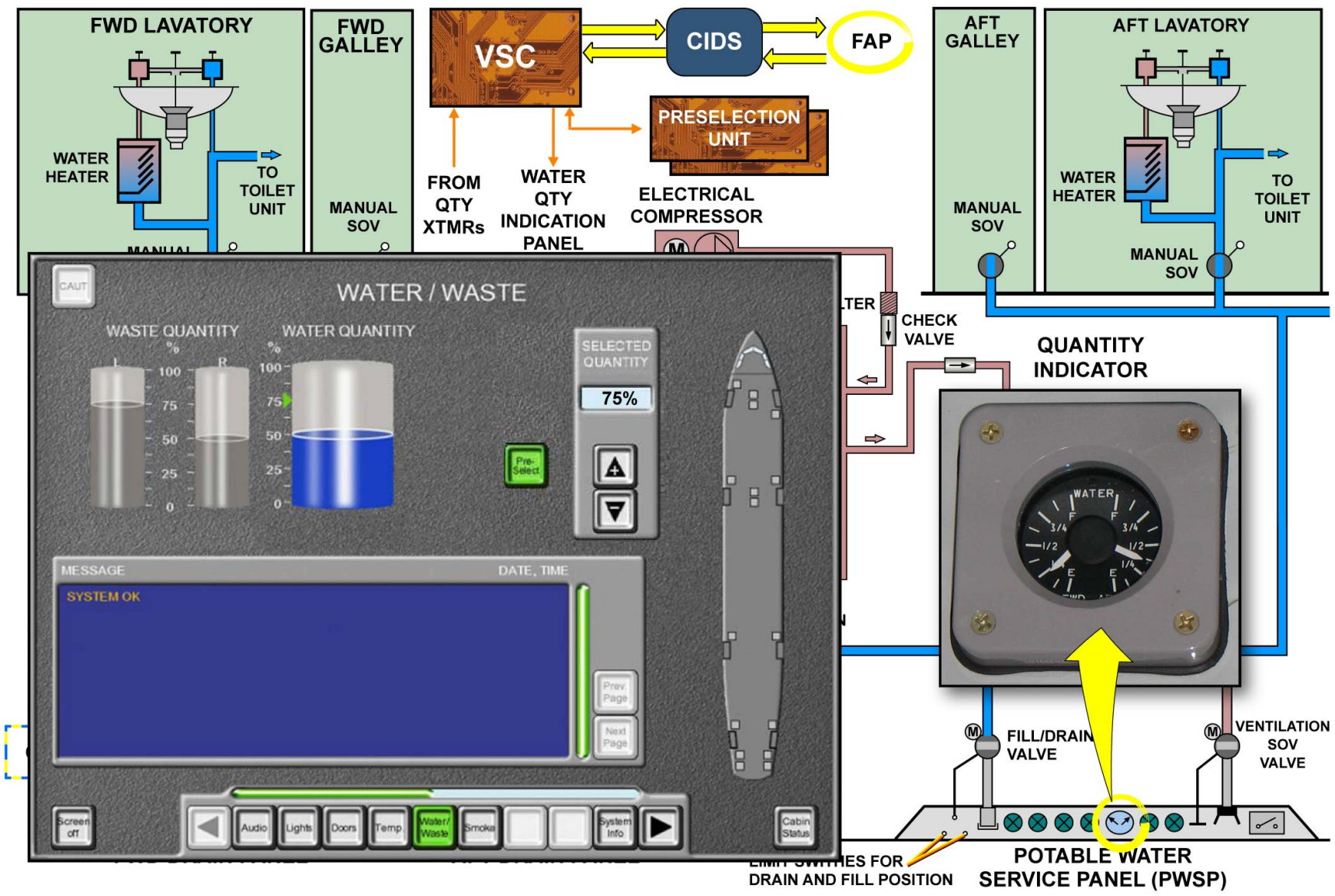
G9409341 - GAUT0T0 - FM38D1000000004

POTABLE WATER SYSTEM D/O (OPTION 3 TANKS) (3)

INDICATING

Two tanks have an ultrasonic unit quantity transmitter, which sends signals to the Vacuum System Controller (VSC). The VSC transmits the signal directly to the water indication panel on the Potable Water Service Panel (PWSP) and through the Cabin Intercommunication Data System (CIDS) to the Flight Attendant Panel (FAP). The VSC transmits the potable water quantity pre-selection signals from the FAP to the pre-selection units. The indication panel has an indicator. Note that the indication panel is optional.
The display unit on the FAP shows:
- the water quantity,
- the condition of the potable water system,
- the pre-selection value,
- the possible failure messages of the system.

G9409341 - GAUT0T0 - FM38D1000000004


FWD LAVATORY
WATER HEATER
TO TOILET UNIT
FWD GALLEY
MANUAL SOV
VSC
CIDS
FAP
PRESELECTION UNIT
FROM QTY XTMRs
WATER QTY INDICATION PANEL
ELECTRICAL COMPRESSOR
AFT GALLEY
MANUAL SOV
AFT LAVATORY
WATER HEATER
TO TOILET UNIT
MANUAL SOV
WATER / WASTE
WASTE QUANTITY
WATER QUANTITY
SELECTED QUANTITY
75%
Pre-Select
MESSAGE
DATE, TIME
SYSTEM OK
Prev Page
Next Page
Screen off
Audio
Lights
Doors
Temp
Water/ Waste
Smoke
System Info
Cabin Status
CHECK VALVE
QUANTITY INDICATOR
WATER
FILL/DRAIN VALVE
VENTILATION SOV VALVE
DRAIN AND FILL POSITION
POTABLE WATER SERVICE PANEL (PWSP)

INDICATING

POTABLE WATER SYSTEM D/O (OPTION 3 TANKS) (3)

FILLING

Filling can be done with or without electrical power.

WITH ELECTRICAL POWER

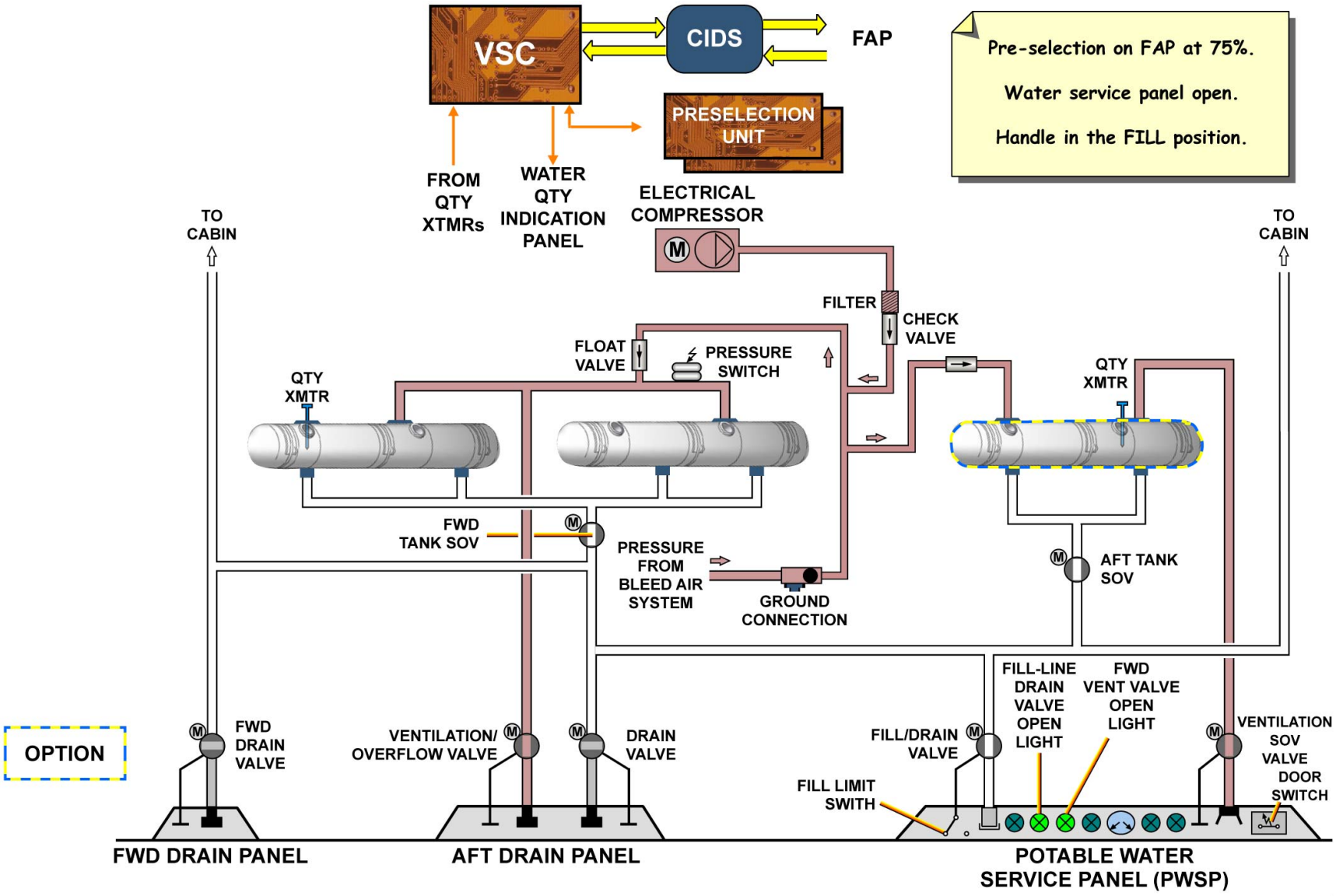
On the FAP, the pre-selection level can be set to 25%, 50%, 75% or 100%. On the PWSP, turn the control handle from NORMAL to the FILL position. Then, the fill/drain valve, the ventilation/overflow valve and the ventilation SOV valve open electrically. The "FILL-LINE DRAIN VALVE OPEN" control light and the "FWD VENT VALVE OPEN" control light come on.

During filling, the water quantity is transmitted from the VSC to the CIDS.

When the set value is reached, the "FWD TANK FULL" control light for the two forward tanks, and the "AFT TANK FULL" control light for the aft tank come on.

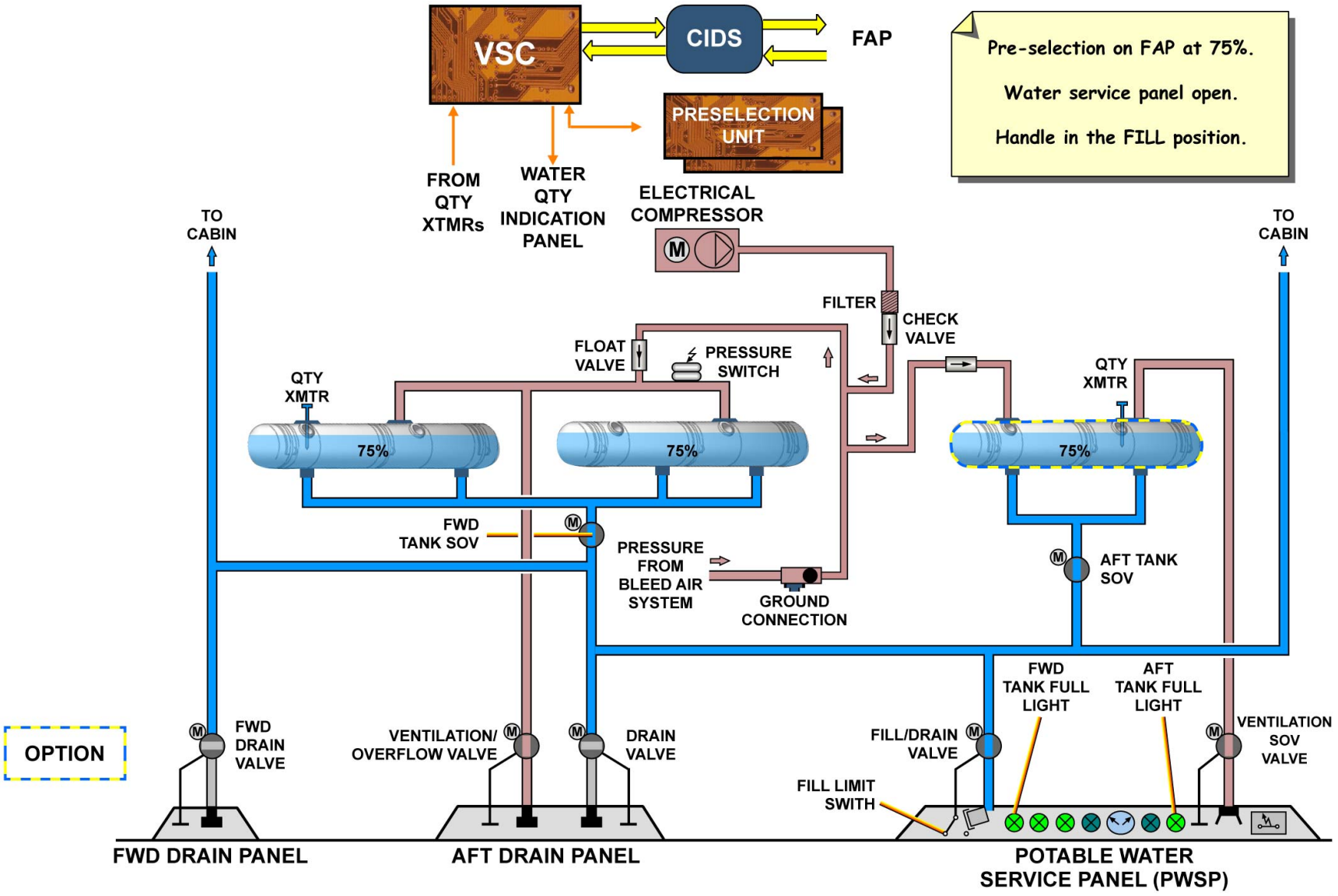
After the three tanks have reached the set level, the fill/drain valve closes, the control handle goes back to the NORMAL position automatically, and the "FILL-LINE DRAIN VALVE OPEN" control light goes off. The ventilation SOV valve and the ventilation/overflow valve are closed electrically and the "FWD VENT VALVE OPEN" control light also goes off on the PWSP. The potable water filling is completed.

G9409341 - GAUT0T0 - FM38D1000000004



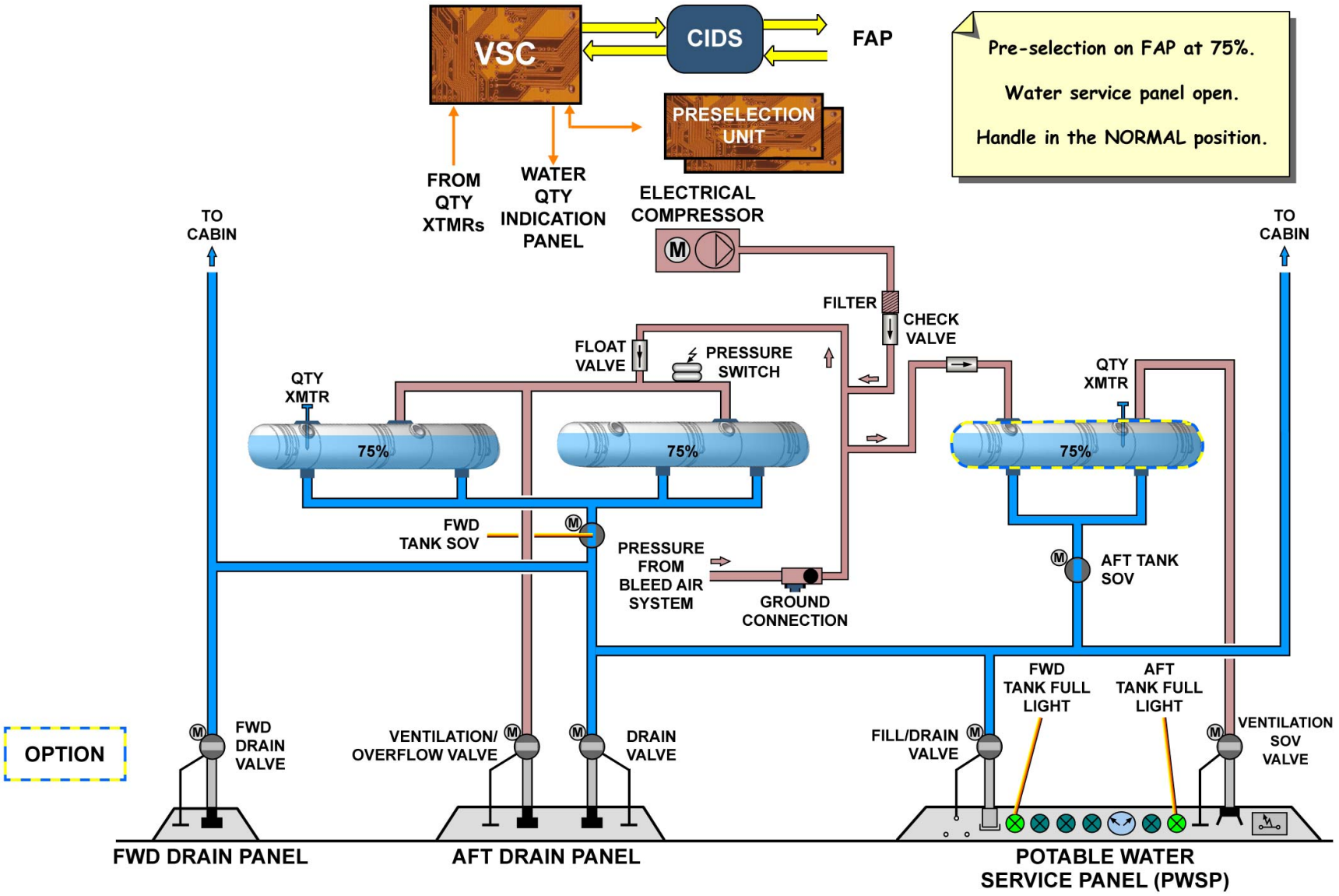
FILLING - WITH ELECTRICAL POWER

G9409341 - GAUT0T0 - FM38D1000000004



FILLING - WITH ELECTRICAL POWER

G9409341 - GAUT0T0 - FM38D1000000004



FILLING - WITH ELECTRICAL POWER

G9409341 - GAUT0T0 - FM38D1000000004

POTABLE WATER SYSTEM D/O (OPTION 3 TANKS) (3)

FILLING (continued)

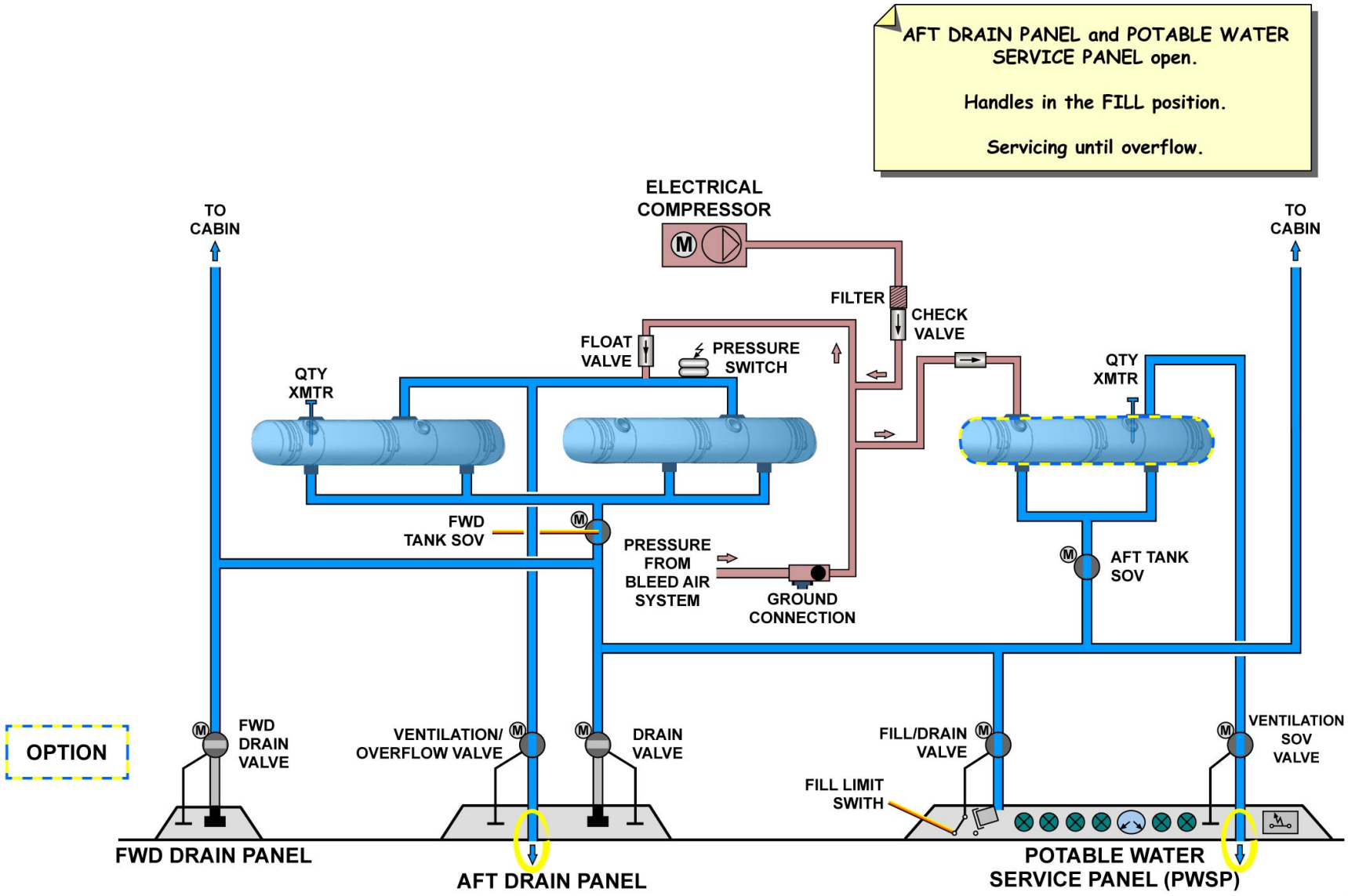
WITHOUT ELECTRICAL POWER

On the PWSP, the fill/drain valve control handle is turned manually to the FILL position and the ventilation SOV control handle is turned manually to the OPEN position. On the AFT drain panel, the ventilation/overflow valve control handle is also turned manually to the OPEN position. Then, the fill/drain valve, the ventilation SOV valve and the ventilation/overflow valves are open.

On the AFT drain panel, when the water flows out of the ventilation/overflow nipple, this indicates that the two forward tanks are full. On the PWSP, when the water flows out of the ventilation SOV valve nipple, this indicates that the aft third tank is also full, and the control handles must be manually placed back into the CLOSE and NORMAL position.

No indication is given on the water quantity indication of the potable service panel.

G9409341 - GAUT0T0 - FM38D1000000004



FILLING - WITHOUT ELECTRICAL POWER

G9409341 - GAUT0T0 - FM38D1000000004

POTABLE WATER SYSTEM D/O (OPTION 3 TANKS) (3)

DRAINING

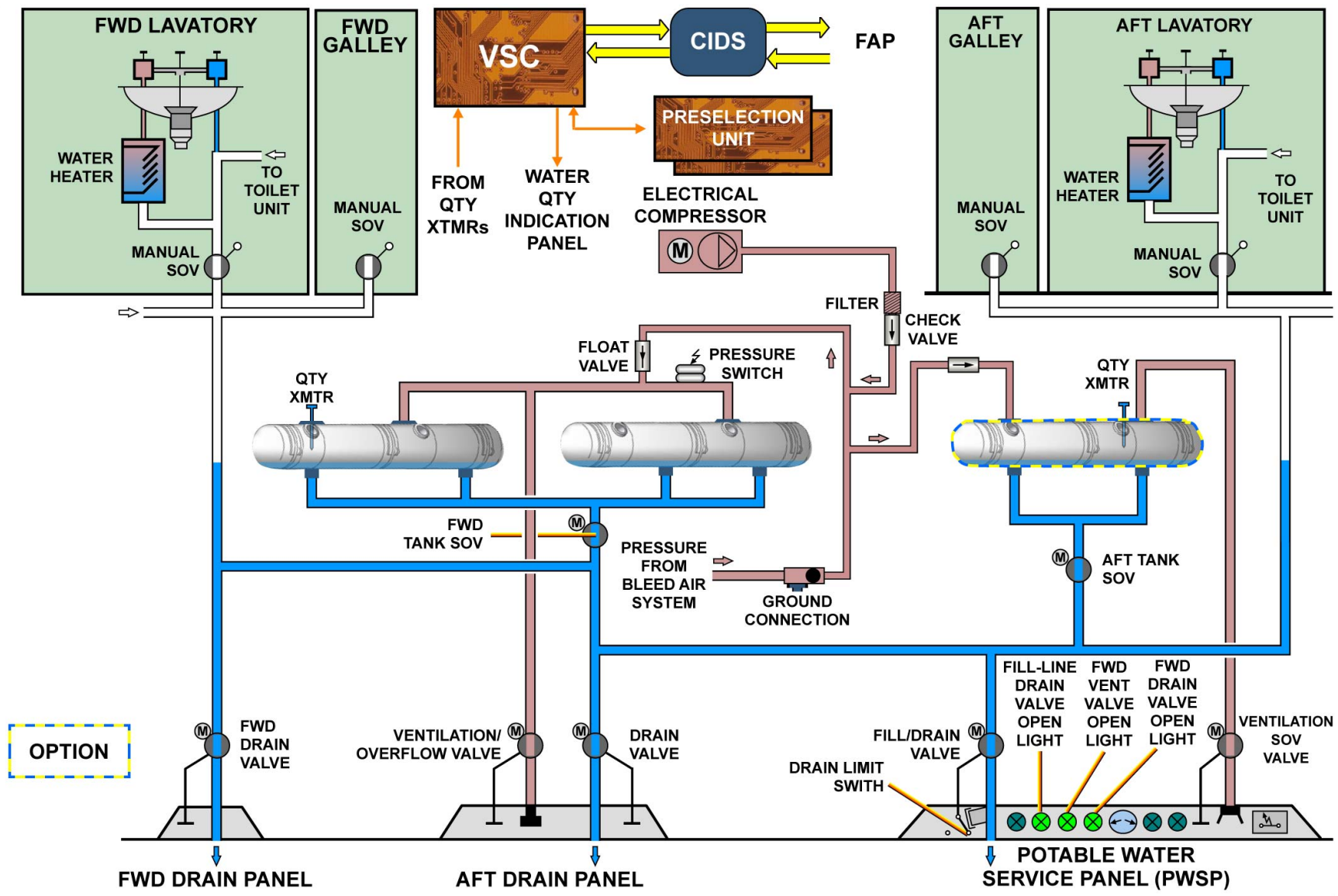
Draining can be done with or without electrical power.

WITH ELECTRICAL POWER

On the Potable Water Service Panel (PWSP), when the fill/drain valve control handle is turned from the NORMAL to the DRAIN position, the fill/drain valve and the ventilation SOV valve open. On the AFT drain panel the ventilation/overflow valve and the drain valve open electrically, as well as the FWD drain valve on the FWD drain panel. Then, "FILL-LINE DRAIN VALVE OPEN", the "FWD VENT VALVE OPEN" and the "FWD DRAIN VALVE OPEN" control lights come on.
Water drains from the fill/drain port on the PWSP, from the AFT drain port on the AFT drain panel and from the drain port on the FWD drain panel.
When draining is complete, the fill/drain control handle must be manually placed back in the NORMAL position. The ventilation SOV valve, the FWD drain valve, the AFT drain valve and the fill/drain valve close. The ventilation/overflow valve also closes automatically on the AFT drain panel. The "FILL-LINE DRAIN VALVE OPEN", the "FWD VENT VALVE OPEN" and the "FWD DRAIN VALVE OPEN" control lights go off.

CAUTION: MAKE SURE THAT THE DRAIN VALVES STAY OPEN AFTER YOU DRAIN THE SYSTEM. THIS PREVENTS DAMAGE TO THE SYSTEM IN FREEZING CONDITIONS.

G9409341 - GAUT0T0 - FM38D1000000004



DRAINING - WITH ELECTRICAL POWER

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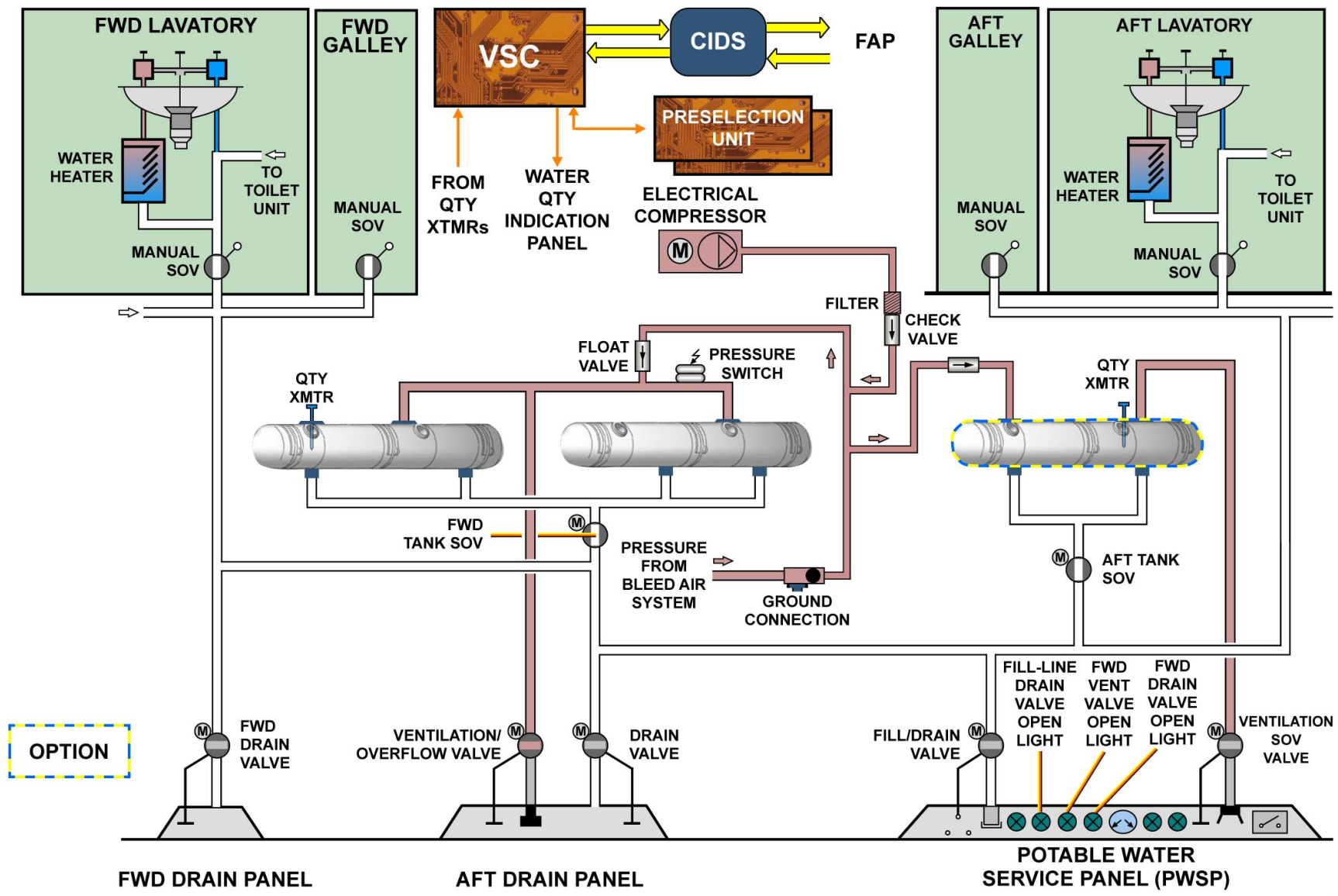

DRAINING - WITH ELECTRICAL POWER

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POTABLE WATER SYSTEM D/O (OPTION 3 TANKS) (3)

DRAINING (continued)

WITHOUT ELECTRICAL POWER

The fill/drain valve control handle is manually set from the NORMAL to the DRAIN position. Pull it out to the mechanical stop to open the fill/drain valve. The ventilation SOV is set manually to the OPEN position. Water from the aft third tank drains through the fill/drain port on the PWSP. Afterwards, on the AFT drain panel, the ventilation/overflow valve and the drain valve are set to the OPEN position using the control handles. Water from the two forward tanks drains through the drain port on the AFT drain panel.
Finally, the FWD drain valve is opened manually using the control handle on the FWD drain panel to complete the draining. Water drains from the drain port on the FWD drain panel. On the PWSP, no indication is given on the valves position.
When draining is completed, put all valves to the CLOSE or SHUT position and afterward set the control lever of the fill/drain valve to the NORMAL position.

CAUTION: MAKE SURE THAT THE DRAIN VALVES STAY OPEN AFTER YOU DRAIN THE SYSTEM. THIS PREVENTS DAMAGE TO THE SYSTEM IN FREEZING CONDITIONS.

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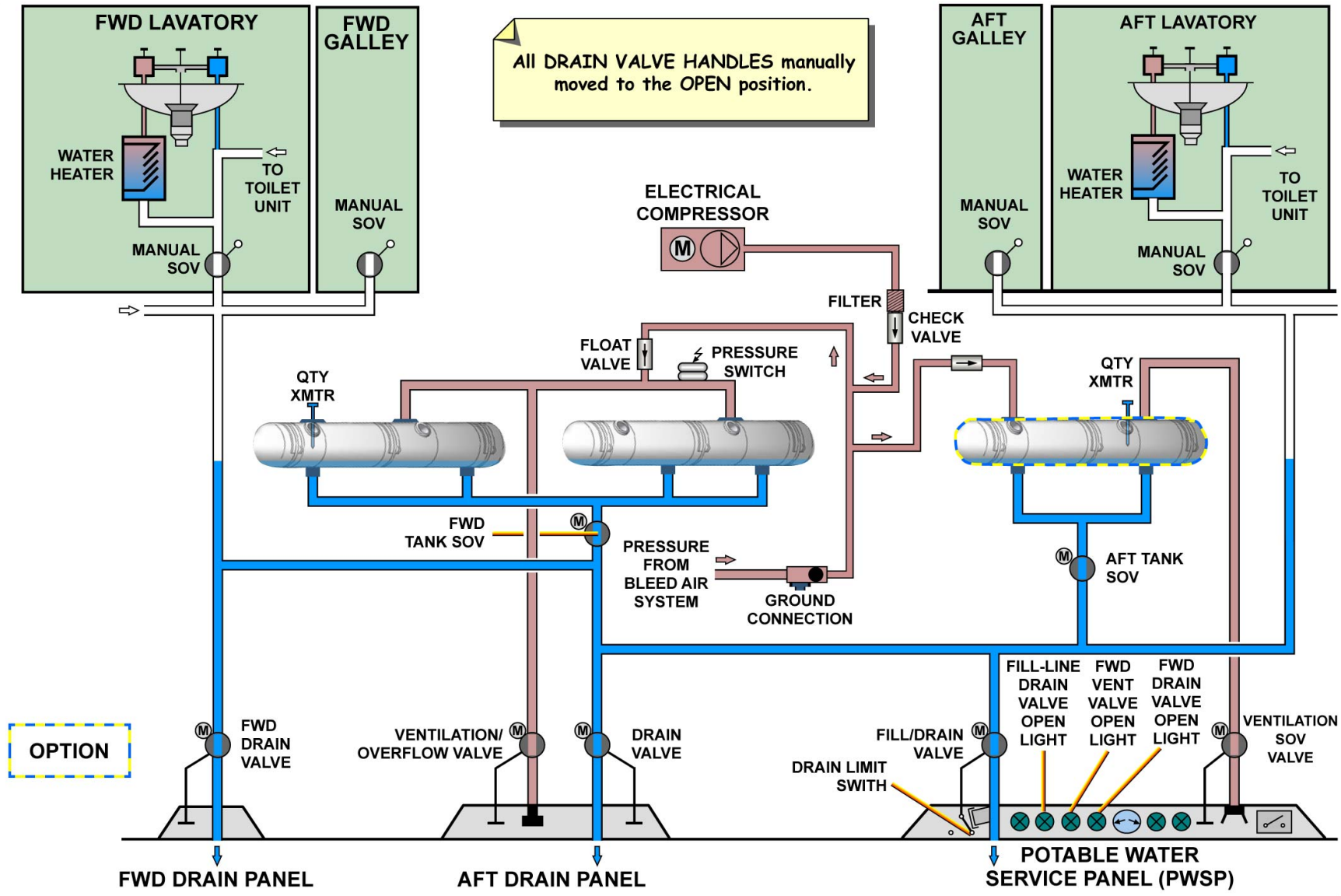

DRAINING - WITHOUT ELECTRICAL POWER

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AIR SUPPLY SYSTEM D/O (3)

GENERAL

Water tank pressurization is required to deliver water under pressure to the lavatories and galley faucets. The water tanks are pressurized between 25 psi and 30 psi (1.7 bar and 2.1 bar) using different sources:
- the A/C pneumatic system (engines, APU),
- an electrical compressor,
- a ground air supply system.

A float valve prevents water from flowing from the Potable Water System (PWS) to the air supply system.

AIR SUPPLY SYSTEM

The shuttle valve allows the tanks to be pressurized either by the pneumatic system or the ground air supply system. The air filter makes sure that unwanted material and dirt do not get into the system. The relief and pressure-regulating valve maintains the pressure in a range of 25 to 30 psi and prevents overpressure in the water tank by opening when the pressure reaches 34 psi (2.3 bar). The air check-valves let the pressurized air flow only in the direction of the water tanks to prevent:
- a decrease of the pressure in the water tanks,
- an airflow between the tanks,
- a water flow in the direction of the air supply system.

AIR SUPPLY BOOST SYSTEM

The compressor power supply is a 115V AC three-phase current. One air filter is installed on the inlet line and on the outlet line of the compressor. A thermal-overload protection circuit protects the motor from overheating.
Depending on the pressure detected by the pressure switch (between 25 and 28 psi) at the overflow line of the water tanks, the relay energizes the electrical motor of the compressor. The compressor supplies clean compressed air at 28 psi (1.9 bar) to the PWS.

GROUND AIR SUPPLY SYSTEM

On ground, the water tanks can be pressurized. The ground-air pressure connection is installed through a hose with the air pressure manifold in the aft cargo compartment.

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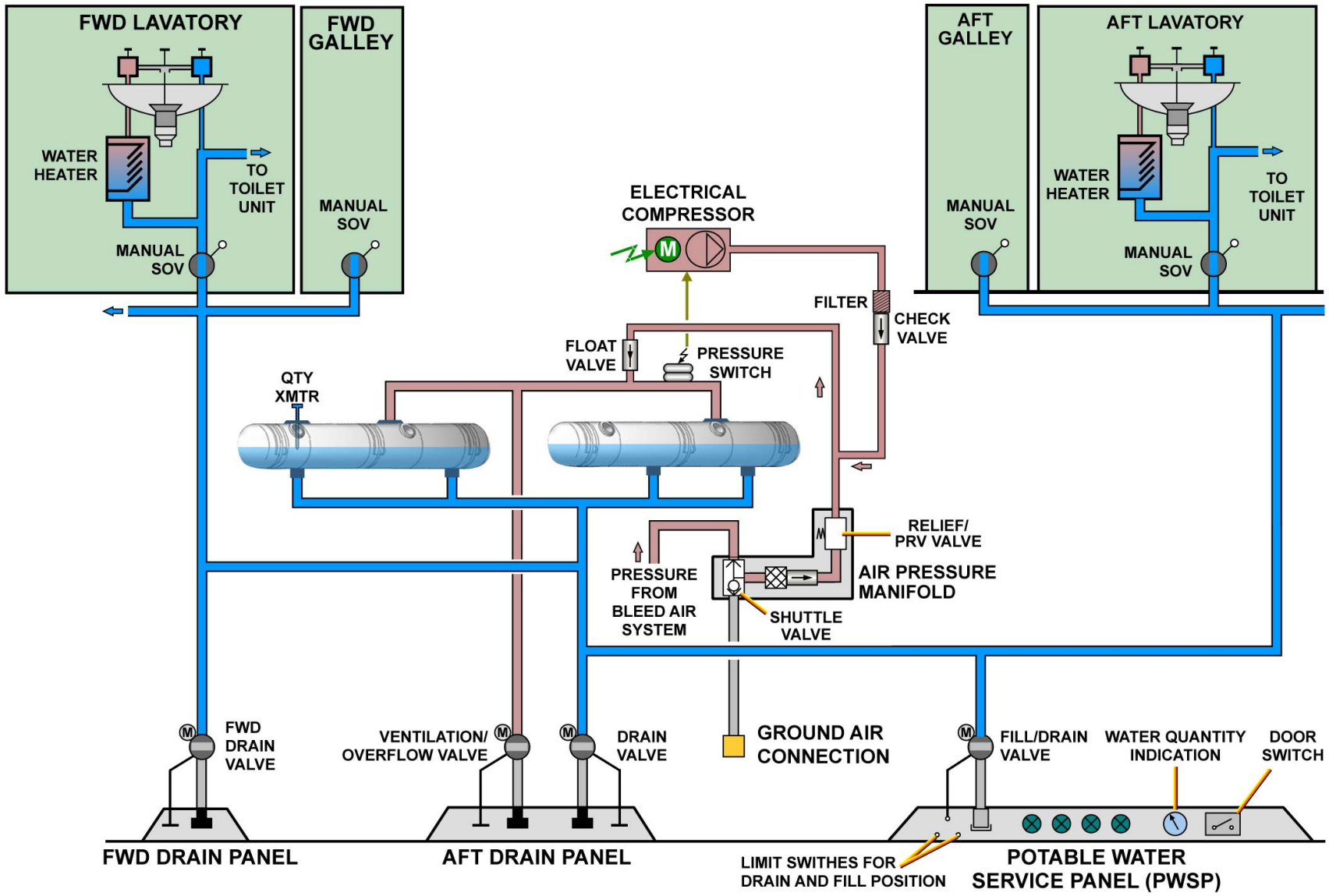

GENERAL ... GROUND AIR SUPPLY SYSTEM

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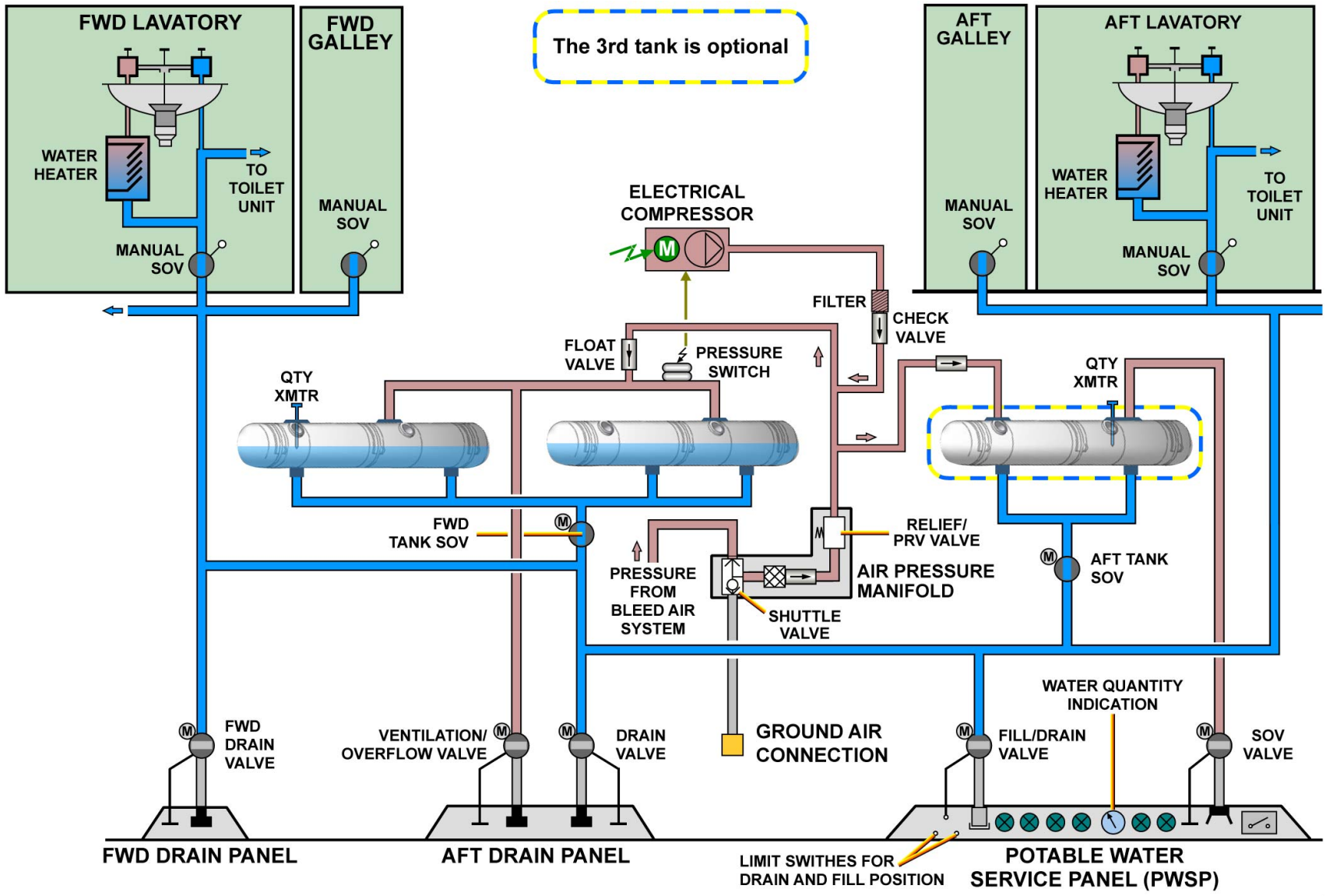

GENERAL ... GROUND AIR SUPPLY SYSTEM

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TOILET SYSTEM D/O (3)

GENERAL

The toilet system uses potable water to flush the toilet bowl during the flush cycle. The toilet has two subsystems, one on the left hand and one on the right hand sides. The subsystem has toilet Units, two Waste Holding Tanks, a Vacuum System, a Differential Pressure Sensor, a Waste Level Sensor. A Waste Level Transmitter is installed on the bottom of the Waste Holding Tank. To make sure that the Waste Level Transmitters operate correctly when the pressure in the tank changes, the Waste Level Transmitters are connected to the vacuum line.

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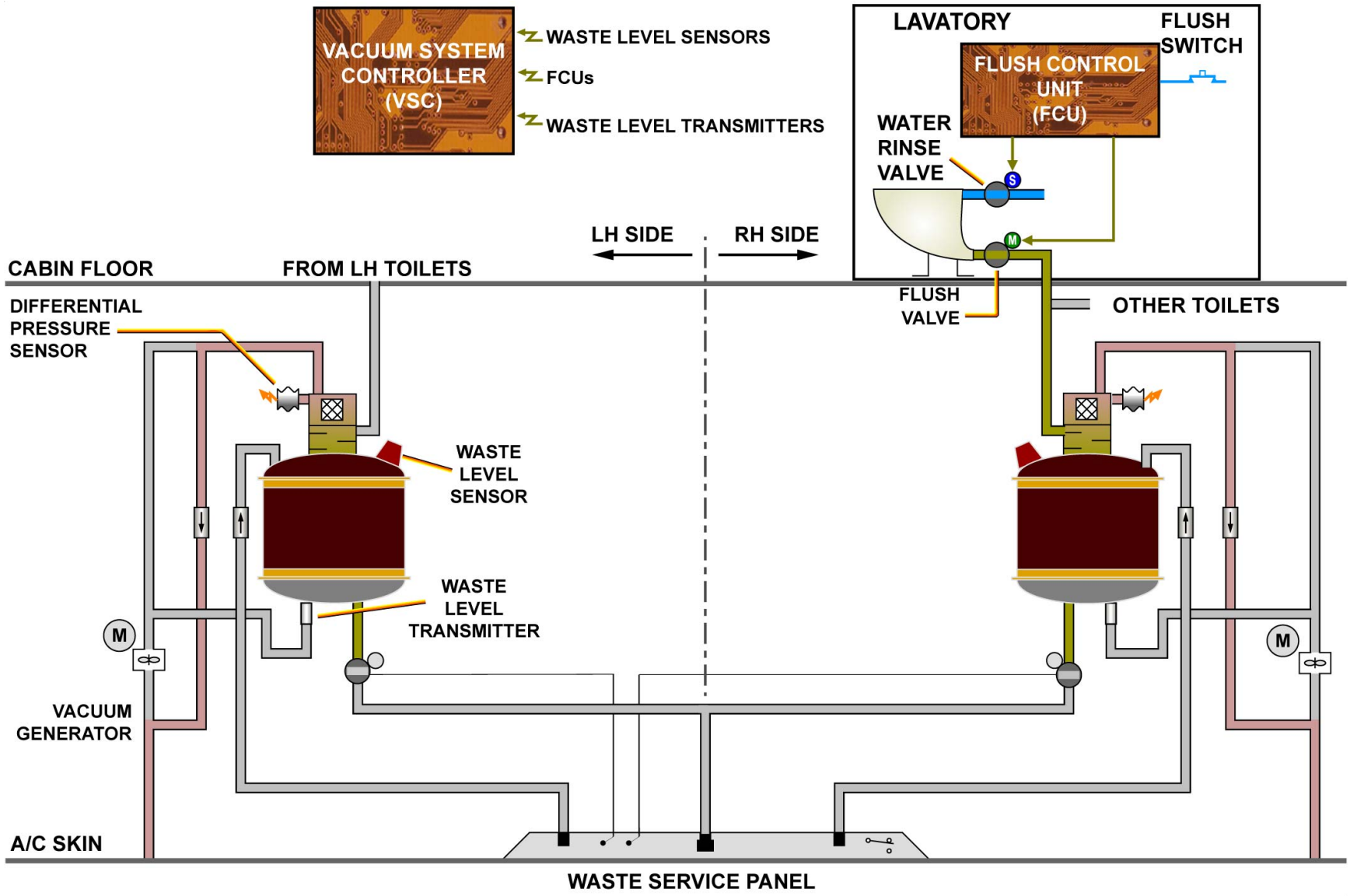

GENERAL

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TOILET SYSTEM D/O (3)

FLUSHING

When the Flush Switch is pushed in the lavatory, an electrical signal is sent to its Flush Control Unit (FCU), which starts the flush sequence.
The FCU:
- signals the Vacuum System Controller (VSC) to start the Vacuum Generator depending on altitude,
- opens the Water Shutoff/antisyphon Valve to rinse the toilet bowl with potable water,
- opens the Flush Valve.

The Water Shutoff/Antisyphon Valve is a solenoid type valve. It supplies the spray ring. The valve is equipped with an antisyphon device. An electrical motor operates the Flush Valve.
The FCU BITE monitors the operation of the Water Shutoff/Antisyphon Valve, the Flush Valves and its internal control circuitry. If a failure occurs, a signal is transmitted to the VSC.

VACUUM

A differential pressure is necessary to move the waste from the toilet bowl to the tank. The generators give the necessary differential pressure in the applicable Waste Holding Tank when the A/C is on ground, and up to 16000 feet +/ - 700 ft, creating a differential pressure between 4 psi (0.28 bar) and 9 psi (0.62 bar) below the cabin pressure. The Waste Level Transmitter monitors the level in the Waste Holding Tank and sends a signal to the VSC.
The VSC uses the Differential Pressure Sensors, and energizes the motor start relay of the Vacuum Generator when necessary. The VSC monitors the thermal switch circuit on the Vacuum Generator. If a Vacuum Generator becomes too hot, the thermal switch opens and the VSC de-energizes the Vacuum Generator.

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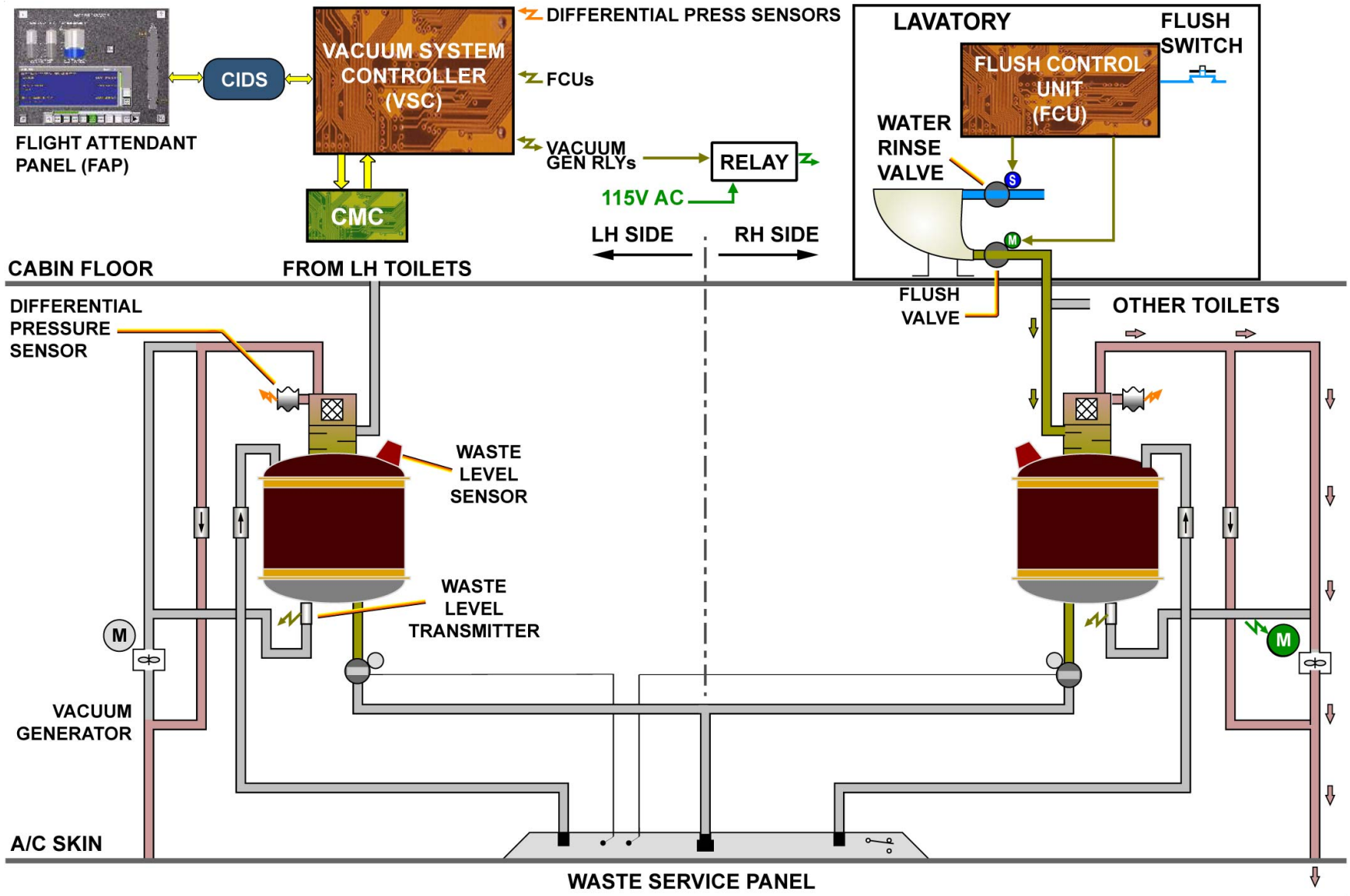

FLUSHING & VACUUM

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TOILET SYSTEM D/O (3)

WASTE HOLDING

The Waste Tanks are located in the pressurized area of the A/C, aft of the bulk cargo compartment. Each tank has a capacity of 350 liters (92.5 US gal).
The tank receives waste from the toilet through a centrifugal waste separator/demister assembly, which lets the waste be separated from the air. The air goes through a demister filter to the overboard discharge lines and a differential pressure line.
The Waste Level Sensors show "LAVS INOP" and "WASTE TANK FULL" messages on the Flight Attendant Panel (FAP) when necessary. The Waste Level Sensor operates independently of the Differential Pressure Sensors.

VACUUM SYSTEM CONTROLLER

The VSC:
- controls and monitors the operational status of the system and its components,
- sends a signal to the Central Maintenance Computer (CMC) if the system does not operate correctly,
- gives the Waste Holding Tank level, the system status information and displays it on the FAP,
- stops the left and/or right system in flight, if necessary, and when you do the ground servicing.

The VSC interfaces with the Cabin Intercommunication Data System (CIDS) for the display of the Potable Water Tank level on the FAP and for the pre-selected potable water quantity set on the FAP.
The VSC has BITE to monitor the system. The BITE operates in two modes:
- the power-up test,
- the continuous monitoring test.

In these tests the VSC checks:
- the VSC internal operation,
- the status/operation of the components,
- the hardware and the software in the system,
- the toilet and tank configuration in the non-volatile memory of the VSC and compares it with the A/C toilet and tank configuration,
- the status of the position sensors in the Waste Drain Valve.

The VSC sends a message to the CMC if failures are found.

RESET PUSHBUTTON SWITCH

The Reset P/BSW is installed on the circuit breaker panel 5005VE. It is used to reset the VSC after a fault has occurred. When you push the reset pushbutton switch, the VSC does a power-up test. The reset of the VSC and indications on the FAP take approximately 6 seconds.

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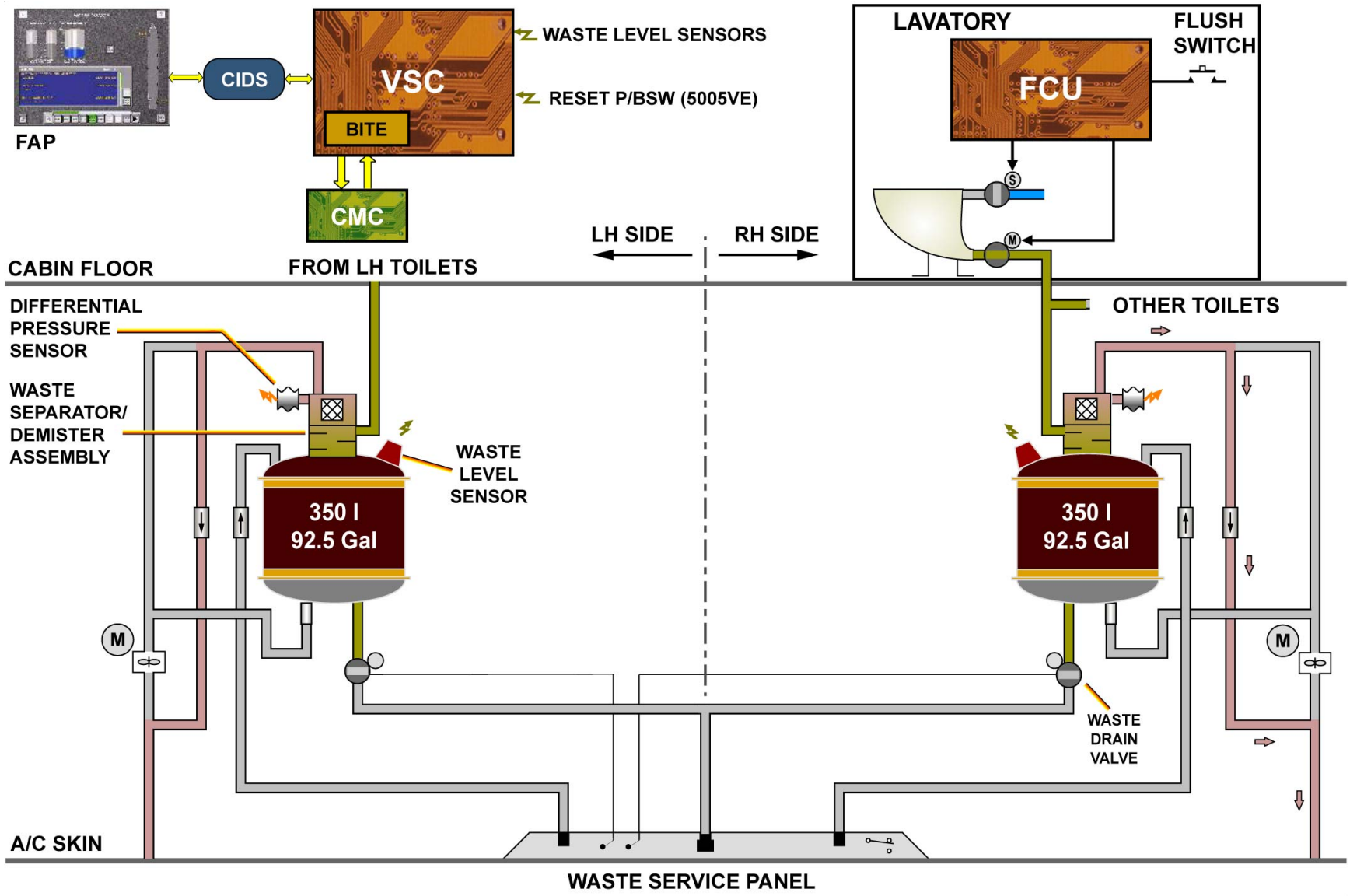

WASTE HOLDING ... RESET PUSHBUTTON SWITCH

G9409341 - GAUT0T0 - FM38D3000000003

TOILET SYSTEM D/O (3)

SERVICING

The Waste Tanks are serviced from a single servicing panel. When you open the door of the Waste Service Panel:
- the Waste Service Panel door switch opens,
- the VSC stops the operation of the Vacuum Generators,
- the VSC sends a signal to the FAP.

When open, the Waste Drain-line Valve lets you connect a Waste-servicing Vehicle. Each of the Drain Handles operates its Drain Valve through a cable. The electrical connection on the Drain Valves signals the VSC when the valve is in the open or closed position. During servicing, toilet use is inhibited by automatic deactivation of the FCU. Each flush connection on the Waste Service Panel lets its tank to be rinsed. The water pressure makes the nozzles turn during the cleaning of the waste holding tanks. The water removes the unwanted material from the walls of the tank and the Waste Level Sensors.

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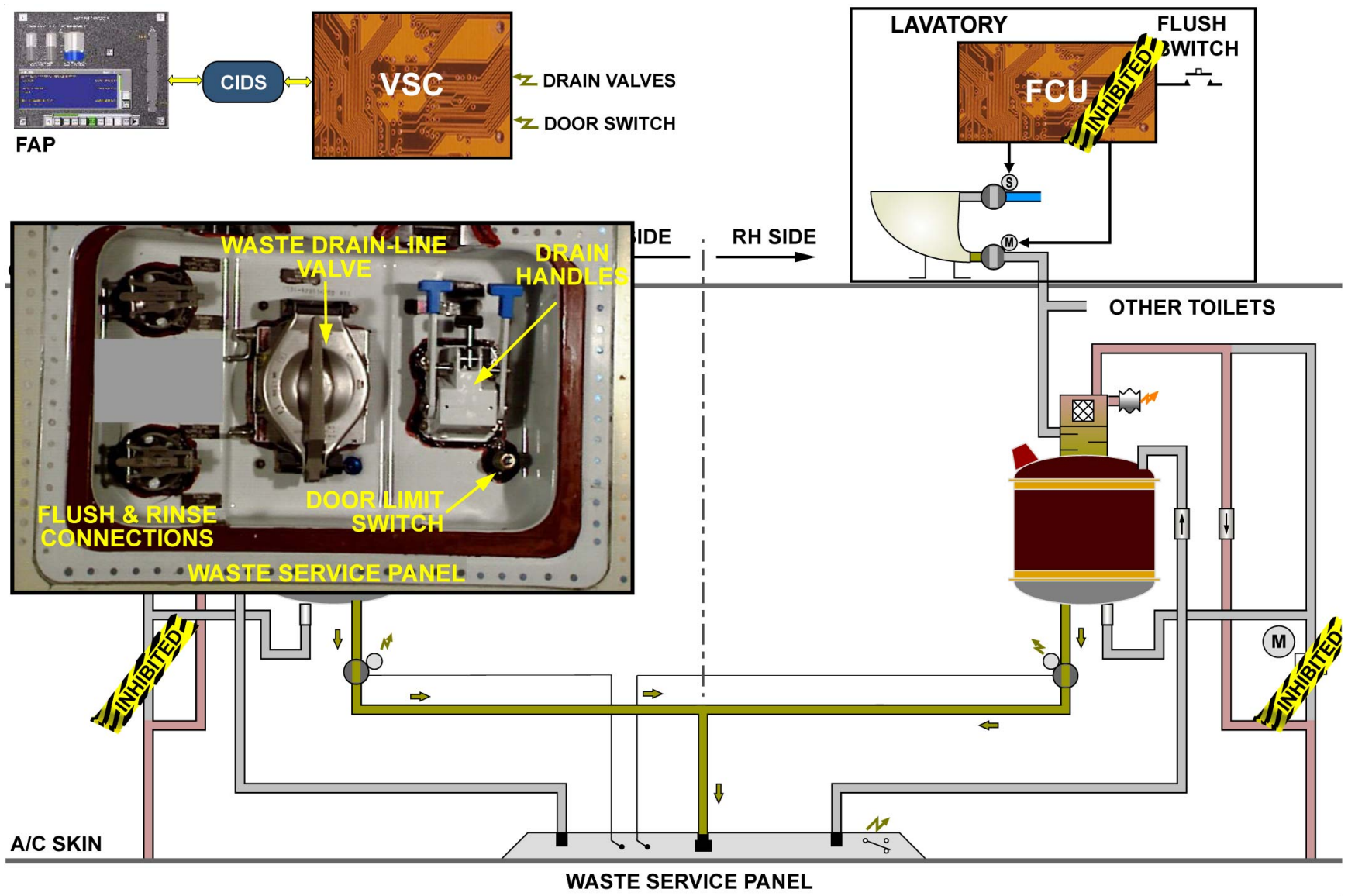


SERVICING

G9409341 - GAUT0T0 - FM38D3000000003

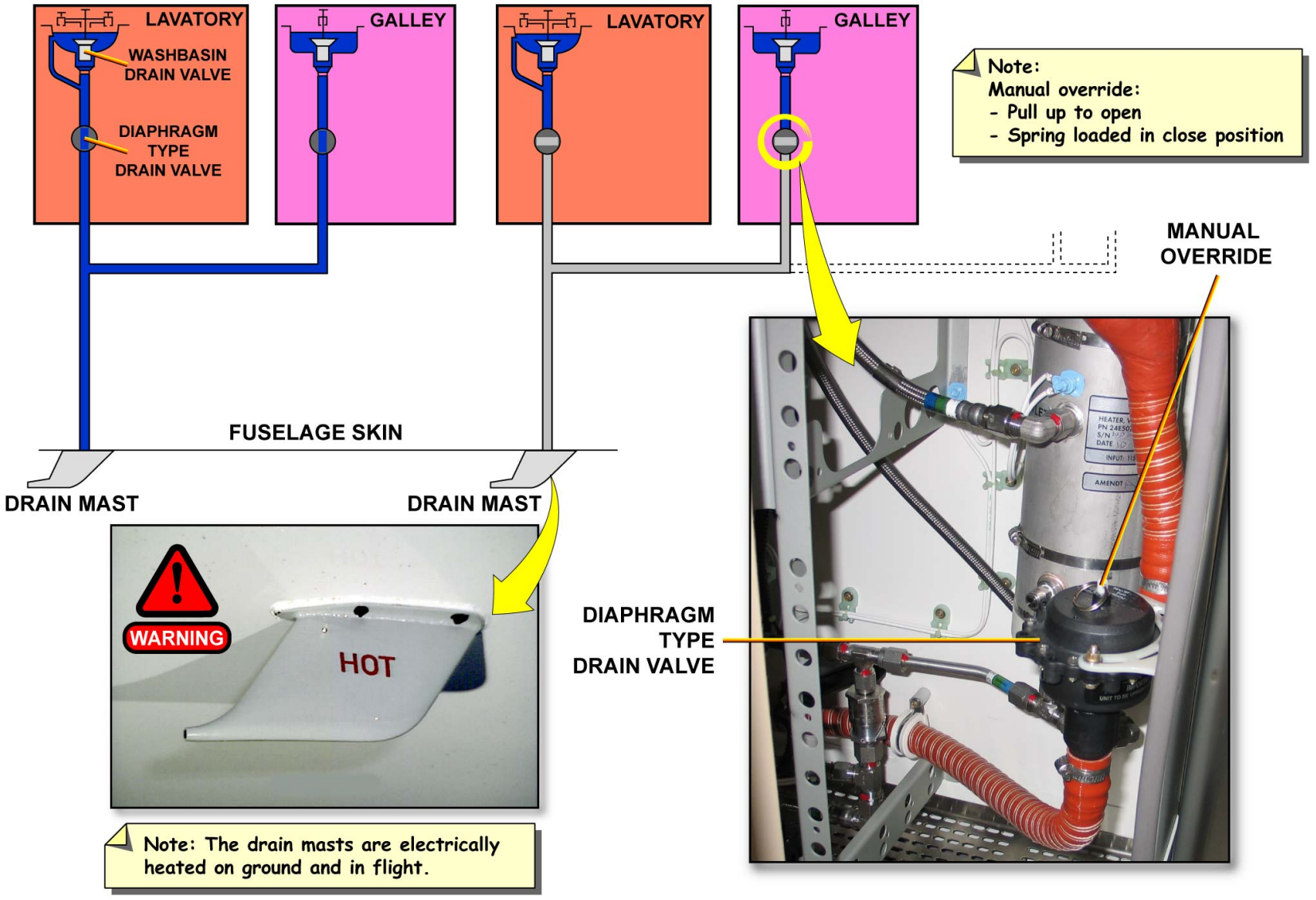
WASTE SYSTEM D/O (3)

DRAIN VALVE

Waste water disposal is achieved by gravity on ground and by differential pressure and gravity action in flight. The diaphragm type drain valve controls the flow of waste water and prevents permanent leakage of cabin air through the drain lines.

DRAIN MASTS

The waste water is discharged overboard through two drain masts. To prevent ice formation, the drain masts are electrically heated on ground and in flight.



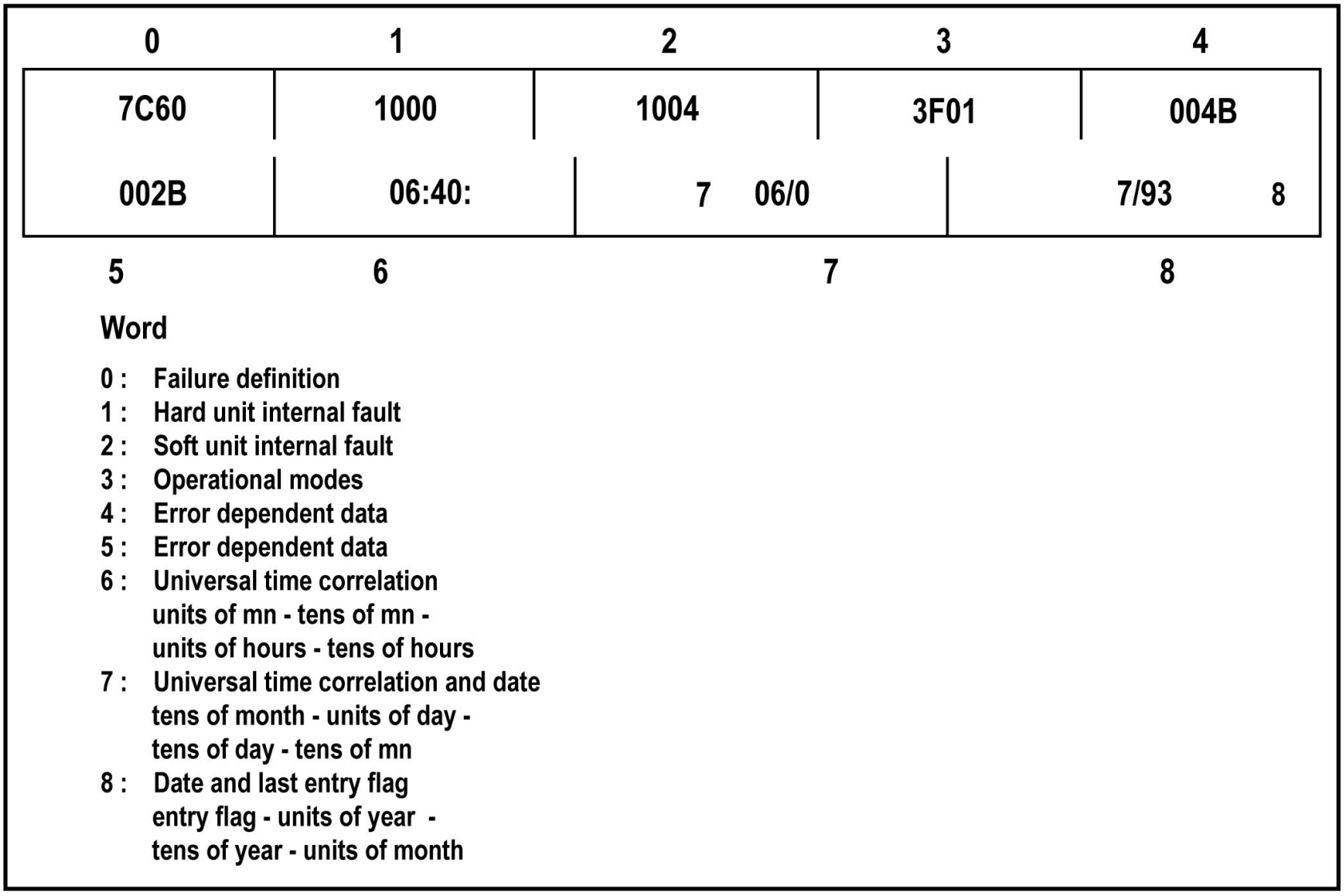
DRAIN VALVE & DRAIN MASTS

G94093341 - GAUT0T0 - FM38D4F38AG0102

WATER AND WASTE MCDU PAGES (2)

TROUBLE SHOOTING DATA

When the TROUBLE SHOOTING DATA key is pressed, the screen shows the date and time when the failure occurred, the failure message and the related coded parameters. The trouble shooting data represents a system snapshot at failure occurrence. The trouble shooting data table or the floppy disk provided by manufacturer will help you decode the message.



TROUBLE SHOOTING DATA

G94093341 - GAUT0T0 - FM38P3MCDUTST02

WATER AND WASTE MCDU PAGES (2)

SYSTEM TEST

When the TEST key is pressed, the whole vacuum waste system is tested.
The systems test includes the return of the power up test, the cyclic tests and the continuous tests.
The TEST OK legend is displayed if no failure is detected.
Ground Scanning
Displayed all failures detected after starting this submenu, trouble shooting data are selectable for every displayed failure.
Ground Report
Displayed all failures occurring on ground,
Trouble Shooting Data
Displays the trouble shooting data of all failures are displayed by the menus :
- Last Leg Report
- Previous Leg Report
- Class 3 Faults

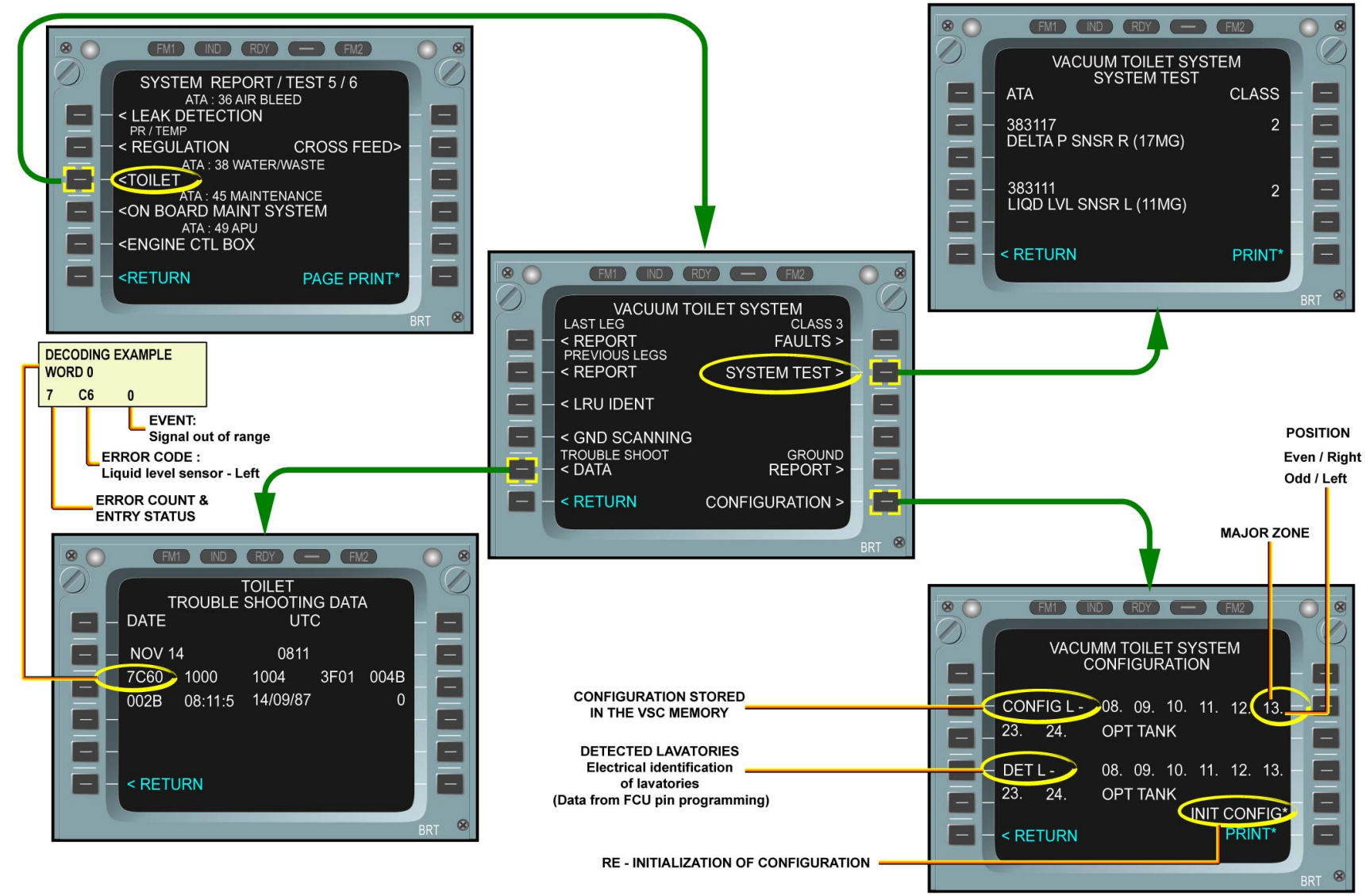
CONFIGURATION

When the CONFIGURATION key is pressed, the lavatory configuration stored in the Vacuum System Controller (VSC) memory is indicated:
CONFIG L (configuration lavatories) and DET L (detected lavatories) are indicated through the Flush Control Unit (FCU) pin programming.
The re-initialization of the configuration has to be done:
- after installation of a new VSC.
- in case of CMS fault message LAV CONFIGURATION.
- if DET L and actual A/C configuration are the same but different from CONFIG L.

This will automatically modify the CONFIG L.
If DET L is not identical to the actual lavatory configuration, pin programming and/or wiring checks have to be performed according to the Trouble Shooting Manual (TSM).

If the third waste holding tank is installed the CONFIG L and DET L must show OPT TANK.

G9409341 - GAUT0T0 - FM38P3MCDUTST02



SYSTEM TEST & CONFIGURATION

G9409341 - GAUT0T0 - FM38P3MCDUTST02

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